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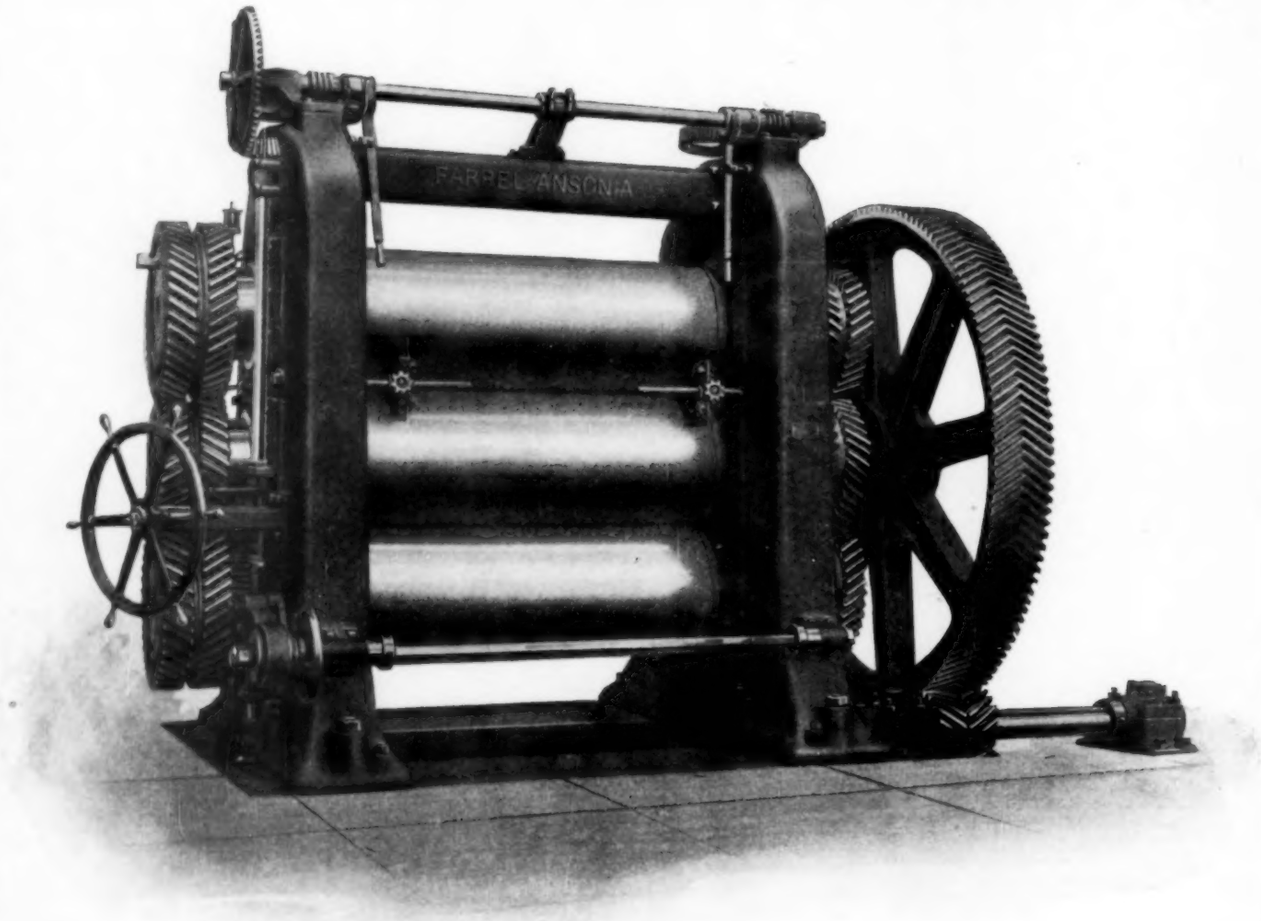

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THE RUBBER AGE AND TIRE NEWS

The Labor Factor in Production—II

By J. C. Long

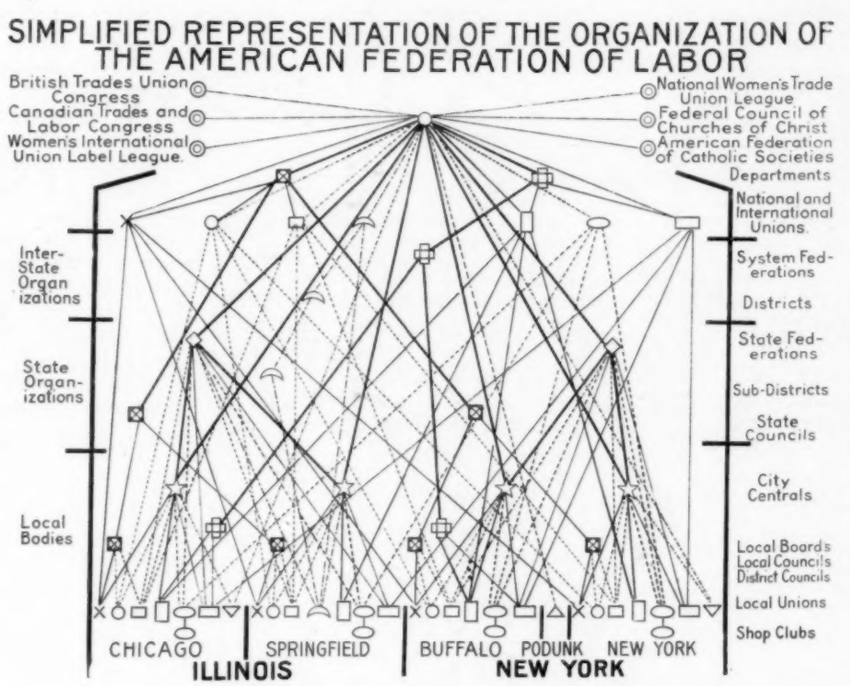
Executive Standing

One of the most important points to be observed in organizing a personnel department is to have centralization, and definition of authority, coupled with the elimination of red tape. In some factories the personnel manager is hired as an experiment and regarded by the employes as a fad. As a half-hearted measure, the establishment of an industrial relations department with all that this entails will be a failure. Recreation, sanitation, hospital work, and the like must be an integral part of the labor policy of any company just as is the payroll. In some cases the personnel manager is also the employment manager. This centralizes authority and avoids conflict between two departments which are working with the same end in view. If there is an employment head and a personnel head, each with equivalent authority, there is likely to be conflict of views and authority with resultant hindrances to both departments. There should be one man, possibly one of the vice-presidents, in general charge of the labor end of the factory whose duty it is to consult with, advise, and direct the various heads of the divisions in this department so that there will be a co-ordinated policy.

Each man's position on the labor staff should be well defined as to authority so that there will be no question as to what he can do, and each person should be given fairly free rein in his own field so long as it does not conflict with other departments. For instance, the staff member in charge of recreation can probably do better work if he is allowed wide scope within the limitations of his budget.

Quick action, elimination of red tape, are other factors which should be provided for in the organization of this work. Immediate settlement of any labor grievance is often possible, whereas if there is delay for several hours the trouble may spread rapidly. Where practicable, it is often a good idea to have fifteen minutes staff meetings every morning to clear up current issues.

The second factor to contend with is the consideration of the employes' wishes, a matter which cannot be profitably overlooked. Before taking up any of the concrete phases of industrial management the personnel executive should familiarize himself with the policies and aims of his subordinates which are largely expressed in the trade union movement.



What of Trade Unions?

The personnel managers who do not make themselves aware of what labor desires to get out of the factory organization are unprepared to handle their departments. It makes comparatively small difference in this regard whether the manager considers that the aims of his employes are "good" or "bad" if he is not fully aware of what these aims are in detail, how the workers regard the industrial relations activities, and on what points the working force is dissatisfied with the organization. In other words, the employment manager should be enlightened with regard to the policies of his subordinates, whether he considers them to be friendly or inimical.

Labor in the Rubber Industry

For this reason, it is the purpose of this article to discuss in some detail the types of trade unionism in the United States. Akron is not a union town and the entire rubber in-

dustry employs a very small percentage of union help. This is due largely to two facts: First, that the labor supply in the rubber trade is largely casual. During the winter time a great many men come in from the rural districts and other types of floating labor are used in the summer time. Secondly, a large percentage of those employed in the industry are foreigners who have not become affiliated with American life, lack the so-called class-consciousness, and are often regarded with distrust by their American fellow-laborers.

One of the few serious attempts to unionize the workers in the rubber industry was made by the I. W. W. in the famous Akron strike. At that time it was estimated that the Akron local had several thousand members, but this has dwindled almost to nothing. The various strikes engineered by the I. W. W. have been shown to be largely flareups in the industrial world instigated by an organization which has small financial resources and little staying power.

Types of Unionism

There is no occasion here to pass on the ethics of unionism but simply to discuss the various types that exist so that the employment manager may have a general idea of the union situation. Any individual labor struggle presents so many factors from so many different points of view that to condemn or praise either party offhand would be futile. One of the foremost authorities on unionism in the United States was the late Robert Franklin Hoxie, author of "Trade Unionism in the United States." He made a lifelong study of the subject from both the practical and theoretical standpoint. His book classifies unions into four groups. The first of these is known as "business unionism," which accepts the wage system, as it is, seeks the best obtainable turns of employment for its own membership and uses the method of collective bargaining to obtain its ends. This type of unionism is also strengthened by mutual insurance and occasionally resorts to strikes. The American Federation of Labor contains all types of unionism in its vast organization, but the business type is predominant in the Federation.

The second classification is "uplift unionism" which accepts along with the wage system the whole existing social order. Its mission is the diffusion of leisure class culture and middle-class virtues among workers. "Mutual insurance is its main function and homiletics its preoccupation." There is no one organization which really represents that type, although there is a strong infusion of uplift in most unions that are dominated by the business animus.

Existing on a much smaller scale are the revolutionary unions which aim at the overthrow of the capitalistic system and its capture by the working class. The Chicago organization of the I. W. W. is the predominant representative of this type which has for its slogan "one big union" and "the general strike."

Predatory or hold-up unionism is the fourth class, which used to be more prevalent than it is now, when irresponsible leaders used the unions for obtaining ends of their own and had no underlying plans of organization except to harass the employers and get as much as possible for themselves and their immediate constituents. This type has several variations. The dynamiting career of the Structural Iron Workers is a familiar example.

There is another class of unions which is created by the employers for their own use and are regarded by the other workers as "yellow." This type is small and has comparatively little influence, because it does not really represent the labor point of view.

Extent of Unionism

Unionism is one of the most complex and widespread of the social institutions in the country. There are probably 30,000 local unions in the country and about 130 national bodies. The American Federation of Labor alone has a membership in excess of two million.

This Federation may therefore be considered the chief labor organization in the country and a review of its structure and how it may affect the rubber industry is worth considering at this point.

The Federation is well named, as it is a combination of national and international unions, each of which has self-government. There is some "sympathetic" striking on the part of various units of the group, but this is usually carried on on a local rather than a national scale. For instance, the Federal Council of Churches of Christ is allied with the A. F. of L., but as a matter of fact comes little if at all under its jurisdiction.

In the Federation there are two main types of organization, the trade unions and the industrial unions. The former type is made up of trade locals composed of men all of the same craft or trade. The industrial union local is made up of the men in all the crafts or trades in a given industry. For instance, if the rubber industry were unionized, all of Akron's population might be in one industrial local, which would be federated with a state and national body, which in turn would send delegates to the A. F. of L. Or, the trade union might predominate in Akron so that the men in, say, the tire room would be in a local of their own and affiliated with tire workers in rubber factories throughout the country. In fact it is the latter type of organization which prevails in the A. F. of L., although industrial unionism is growing. In places which are too small to have organizations related to a given trade or industry, local unions are sometimes formed under the direct wing of the head organization, but it is the policy of the A. F. of L. to connect these units with some minor union in the Federation as soon as possible. Another phase of unionism which often has to be faced is that many cities have central labor unions in which the various crafts and industrial locals are united for common ends, using sometimes the weapon of the sympathetic strike, as was recently the case in Kansas City.

Although the purpose of unionism is, in the main, to get as large a share of the fruits of production, to get "more, more, more, now," there are certain advantages to the employer in handling union labor which are pointed out by its advocates.

Unionists claim to supply the employer with a sufficient amount of responsible high-grade labor. They guarantee to exercise a disciplinary control over their members and see that they do a good day's work for a good day's pay. They promise to relieve the factory from the danger of sudden and ill-considered strikes which sometimes flare up in unorganized industry. They claim to protect the plant from sabotage, waste of materials, and other revolutionary methods of unorganized workers. They assure the employer stability of outlook, guaranteeing to keep the industry supplied with helpers and to reduce labor turnover. They claim that their membership can turn out better work than the unorganized workers, and that they can perform many auxiliary tasks which the unorganized laborer is not competent to handle.

Preparedness

There are many arguments on the other side which need not be presented here. The personnel manager is usually from the employing class and is aware of the features of unionism which are usually considered inimical to that class. The employment executive of a present day factory, however, should familiarize himself with all sides of the question in order to prepare himself for issues which are sure to arise.

According to the experiences of factories and business houses so far as

these have come within the writer's knowledge, the restaurant is one phase of industrial management which never meets with opposition from the employes. Bonus systems, profit-sharing plans, housing regulations, and insurance are sometimes opposed on the grounds of paternalism, but this cry never seems to be raised against the restaurant.

Even in institutions like the New York Life Insurance Co., where the noon-day meal is provided for the employes free of charge and is compulsory, there is no cry of industrial feudalism. Apparently the ever-present human delight in a " free feed " overcomes temporarily whatever theoretical objections some of the more independent employes may have to apparent patronage. The New York Life company, however, estimates that it is repaid for this outlay by the better work which the employes do in the afternoon compared with the output before this system was established.

Although it is the frequent practice in New York City for banking houses who have industrial relations department to conduct restaurants free of charge or on a less-than-cost basis, yet the general practice in factories throughout the country is to run moderate-priced establishments which aim to pay for themselves directly.

The Rubber Age Trade Information Exchange

Inquiries on any rubber trade subject are solicited. Answers in many cases are sent by mail; others are printed below. Address all inquiries to Rubber Age Trade Information Exchange, 120 West 32d Street, New York.

Rapeseed Oil Prices

Inquiry No. 27.—I am in the market for refined rapeseed oil and note that this article is quoted in your market reports at $1.75 to $1.80 a gallon, whereas, I have not been able to buy it for less than $2 a gallon. Kindly let me know where I can get refined rapeseed oil at prices quoted by you.

Answer.—You can get refined rapeseed oil at prices quoted in THE RUBBER AGE AND TIRE NEWS market reports, or very near those prices and well below $2.00, from the Boyer Oil Co., 29 Broadway, New York.

Wants Orange Oil

Inquiry No. 28.—Will you kindly put us in touch with a source of supply of orange oil such as is used in deodorizing rubber for certain lines of manufacture?

Answer.—Orange oil is not generally handled by dealers in chemicals for the rubber trade; it belongs more properly to the drug trade and you can obtain it from the following concerns: Dodge & Alcott Co., 87 Fulton Street, New York; McKesson & Robbins, 91 Fulton Street, New York; Fritsche Brothers, 82 Beekman Street, New York.

McBurney and Mayall Processes

Inquiry No. 29.—We note in your " Technical Course in Rubber Manufacture " descriptions of the Charles McBurney and Thomas J. Mayall methods for reclaiming rubber. Do you know of any plants which are using these methods of reclaiming rubber?

Answer.—We know of no concerns using these methods of reclaiming rubber.

Plans for Mechanical Goods Factory

Inquiry No. 30—We anticipate adding a hose department to our rubber factory, particularly for making molded pneumatic tool hose, garden hose, etc., and possibly also an inner tube and tire accessories department. Have you any plans or layouts covering the scope of such departments?

Answer.—We have no plans of the kind you need, but we have in preparation and will publish shortly a series of articles on the manufacture of mechanical rubber goods, which will include factory plans for this line of rubber manufacture.

Taking Up Buffing Wheel Dust

Inquiry No. 31.—Will you be kind enough to advise us where we may secure a suction device for taking up the fine particles of rubber which fly off buffing wheels when tires and tubes are being buffed?

Answer.—You can obtain the device you want from the United Shoe Machinery Corp., Albany Building, Boston, Mass., or from the Buffalo Forge Co., Buffalo, N. Y.

Entitled to " More Miles "

Concerning Inquiry No. 26, relating to a tire adjustment problem, printed in THE RUBBER AGE AND TIRE NEWS of April 10, we add the opinion of L. B. Mangum:

Have just read, with interest, your article in the April 10 issue regarding a " Tire Adjustment Problem—Inquiry No. 26."

I am inclined to agree with Mr. Goodell rather than with Mr. Jacobus as to an " equitable and honest " adjustment, provided of course that each thread tire is guaranteed for specific mileage, and it is acknowledged by the adjuster that the tire returned is defective.

If the tire listing at $30.05 is guaranteed for 4000 miles, it is only fair to assume that the one listing at $39.85 is guaranteed for 6000 miles; therefore, on this basis, the user is certainly entitled to $19.92 " more miles."

If he prefers to use a " C " thread instead of a " B " thread, he should be given the allowance of $19.92, which would make the adjustment price of the " C " thread $10.13.

I contend that a user is entitled to unearned service on the tire originally purchased when closing adjustments, and have often adjusted regular sizes with oversizes, in each instance making the allowance on the size of tire returned and then deducting from the price of the oversize. For example, if a customer is entitled to a 30 per cent reduction on a 32 x 3½ tire, I do not offer a 33 x 4 for 70 per cent regular value, but figure 30 per cent off the price of a 32 x 3½, and then deduct this much from the price of a 33 x 4.

Review of Recent Books

WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS. By Charles H. Snow, C. E., Sc. D.; Dean of the School of Applied Science, New York University; McGraw-Hill Book Co., New York. (445 pages, illustrated, cloth bound.)

The latest edition of this valuable book is of particular interest to the rubber industry in that rubber is added to the already long line of structural materials which it has been found necessary to teach the rising engineering generation. Heretofore rubber was hardly considered as a structural material in the ordinary sense of the word, but due to the alertness of rubber manufacturers, rubber has gradually begun to take the place of other materials to such an extent that Dean Snow has deemed it advisable to add a large chapter on, " India-rubber as a structural and machine material."

The purpose of the book is to present general as well as physical characteristics of organic structural materials as woods, paints, varnishes, glues, creosotes and india rubber, and it is designed for engineers, architects, students, teachers and others who use the materials described or who are interested in their properties.

This subject naturally was prepared for those with little or no knowledge of rubber and as such it is treated from the very beginning. Gradually the reader is carried from one step to another until a very complete knowledge of the entire collecting, preparation, manufacture and vulcanization of rubber is obtained. The chapter starts with several introductory paragraphs which give sources of the crude rubber supply. Then the collection of latex is followed by the methods used for its coagulation and subsequent obtaining of crude rubber. Classification of rubber is given under the heads of geographical and botanical divisions, followed by explanations of crude and refined rubber, fresh and reclaimed rubber, wild and plantation rubber.

From this point, the various processes which are necessary to produce the finished product are given in a very concise and accurate form. Washing, drying, mixing, compounding, calendering and hot and cold vulcanization are very capably treated so that there is nothing left to the imagination of the student. Enough details of the uses and properties of the finished articles are given so that the designing engineer will not be apt to incorrectly allow of a poor substitute. At the end of the chapter are added the attempts which have been made to secure synthetic rubber and the possibilities of its manufacture becoming sufficiently large so as to be considered as a source of supply.

Dean Snow has consulted many authorities so as to be able to present only the accepted and correct practices of the industry and the book is sure to be much more valued on this account.

Application of Catalysis to Vulcanization

By Andre Dubosc

Crude rubber contains besides pure gum, certain impurities the most characteristic of which are the following: (1) Saponifiable or non-saponifiable resins, with or without rotative power; (2) Azotated matter, in which, besides the proteins isolated by Spence, are found enzymes, the oxidizing effect of which on gums in the presence of air, causes tackiness and the destruction of the rubber.

These substances were long considered detrimental and efforts were made by washing and otherwise to eliminate them as much as possible from rubber. The fact, however, that it was found impossible to successfully vulcanize chemically pure gums produced synthetically, starting from isoprene, led to the belief that the proteins and resins that were lacking in the synthetic products must play a certain role in vulcanization. The same results were obtained from plantation rubber from which it had been attempted either during coagulation or by intense washing to eliminate all matter other than rubber.

As much as it seemed desirable to free rubber from the destructive enzymes, a certain quantity of resins and proteins were found to play a role of prime importance during vulcanization. Since Weber's writings the importance of the proteins had been questioned, and a physical rather than a chemical role was attributed to them—a role somewhat similar to that attributed by Selligmann to the elastic substance of rubber.

Biffen, taking as a basis microscopic analysis in which the proteins that can be colored black with silver salts are easily perceptible, claimed that they played a very important role in coagulation by forming a kind of webbing that enclosed the globules of pure gum. Franck, after many tests on *Hevea* latex, was of the same opinion. Other scientists, however, had shown that proteins were not necessary in obtaining a good coagulum of latex. Jong and Tromp de Haas, for instance, found no difficulty in coagulating Castilloa latex after removing the proteins with alcohol. Spence and Crossly obtained perfect coagulation in latices greatly diluted in water in which the proteins could not coagulate at the same time as the caoutchouc. Victor Henry and Zimmermann, pursuing microscopic studies, arrived at the conclusion that rubber latex will coagulate without any proteins being present. Lastly, Barrett found that in acetic acid coagulation such as is made on Far Eastern plantations, the richness or the poverty of the latex in proteins did not affect coagulation in any respect. These studies concerned the physical role only of the proteins, their chemical role, which is far more important, being disregarded.

The theory advanced by Weber and Biffen would appear therefore to have been wrong.

Chemical Role of Proteins

Lock and Bumber made the first observations concerning the chemical role of proteins. These scientists, studying the physical invariables of refined plantation rubber after vulcanization, found that its tensile strength was in inverse ratio to its pure gum contents.

The results of these extensive researches showed: (1) That rubber completely freed of its resins by prolonged acetone extraction, does not vulcanize and that a minimum content of 0.3 per cent of these substances is necessary to produce the vulcanization phenomenon; (2) that rubber deprived of its proteins vulcanizes slowly and poorly and that its tensile strength, compared with an ordinary sample, is reduced from 5 to 1 and the coefficient of vulcanization drops from 3.62 to 1.15.

Stevens and Beadle made another discovery of great importance when they found that if one artificially increases the protein or the azoted substance contents of rubber, vulcanization is accelerated, physical constants and tensile strength especially are increased and the coefficient of vulcanization becomes higher.

These very important discoveries undoubtedly proved the important chemical role played by resins and proteins in vulcanization. An accelerating and vitalizing role, due probably to catalytic action, although neither Beadle, Stevens nor Lothar Weber furnished any explanation of this action. They limited themselves to noting results without advancing any theory on the subject. Their observations were correct. Subsequent researches of Grantham and Eaton and finally their last published studies in July, 1916, not only confirmed these discoveries but further showed the growing importance of the role played by proteins and resins in vulcanization.

Eaton and Grantham noted that under the influence of anerobe bacteria, the proteins of rubber changed into a composition that they were unable to isolate. This composition during vulcanization, acts as an accelerator and lessens the heating time, and increases physical constants, in the latter case acting as a vitalizer. In the presence of antiseptic substances such as formol, the bacteria transformation does not occur, and there is no acceleration but, nevertheless, a slight increase in the physical constants. This latter will be explained more freely later.

The same negative results are noted when rubber is sterilized by steam or by cryoscopy, thus preventing bacteriological action on the proteins. By treating in the same manner other proteins, such as casein, peptones, and proteins precipitated from serums, similar, if not the same accelerating and vitalizing results, are obtained.

It must be stated, however, that the results obtained are not dependent upon the nitrogen content of the rubber and that a sample with a high content of nitrogen frequently gives results that are less desirable than another far less rich in azote. If one accepts the theory that azote cannot easily enter into reaction except under certain given conditions produced by bacteriological action, this feature is easily explained. An explanation for all this is to be found in the researches of Effront, which were probably unknown to Eaton and Grantham, treating of the doubling of proteins and diamine acids under the influence of bacteria or enzymes.

Effront laid down the principle that of under suitable conditions an enzyme is caused to react on a protein, the latter is doubled in fatty acids on one hand, and in amines or ammonias, on the other.

If we go to Spence's researches we will find that the protein of rubber presents itself in the shape of a conjugated protein, probably a glyco-protein, which by hydrolysis becomes a glyco-amine. It is almost certain that it is this substance that develops in the reactions reported by Eaton and Grantham and reacts as an accelerator and a vitalizer. These reactions are therefore due to an amine or an amine substance. This is a very important fact which makes it possible to explain the chemical phase of the reactions that we have just mentioned.

Reactions

These facts being established, and the action of the resins and proteins in vulcanization being also established, let us examine successively what reactions occur when sulphur is caused to react at vulcanizing temperature on these two substances.

The resins of rubber present them-

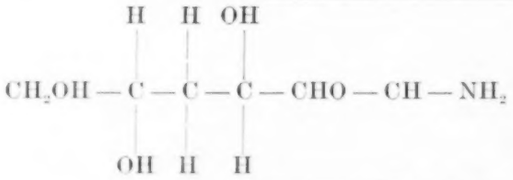
selves as cholesterol ethers, acetates, amyrine and lupeol acetate. That is to say, ethers produced by the action of a fatty acid, acetic acid, on a secondary alcohol, cholesterol.

Under the influence of heat these ethers have a tendency to decompose and the very complex molecule of the cholesterol to crack and give birth to less complex products. When the cracking occurs, as can be noted in pyrogenating the resins of gutta Jelutong, an abundance of hydrogen and acetylene is released.

At vulcanizing temperatures this decomposition is only partial but the quantity of hydrogen produced is sufficient, in presence of sulphur at 135 deg. C., to bring about the formation of hydro-sulphuric acid in large proportion. This reaction was first observed by one of the discoverers of vulcanization, Hancock, and it was also noted by Payen who carefully described it in his studies on rubber.

Therefore, if one studies the action of resins on sulphur at vulcanization temperature, one finds that the result is the generation of hydrosulphuric acid in abundant quantity. We will see further on the important part hydrosulphuric acid may play in vulcanization.

The proteins of rubber which were first isolated by Spence are in the form of conjugated proteins; muscines or the gluco-proteins studied by Schiedberg. They are formed by the uniting of a carbohydrate with an anime, in the form of amino-acids, and by hydrolisis. Under the action of the enzymes which always accompanies this latter process they can hydrolize themselves, giving birth to glucos-amines.



If one prepared the protein of rubber, following the system used by Spence and Kratz, by dissolving crude rubber in benzine in the presence of trichloracetic acid, and then subjecting the product thus isolated to enzymic action, either by rubber enzymes or Effront's "Amylase," one obtains a substance that acts during vulcanization like the fermented proteins of Eaton and Grantham and under analysis, presents the characteristics of gluco-amine. With phenylhydrazine, the protein gives glucoeagone, and with hydrolxylamine, a glucoseamine oxime which melts at 122 deg. C. Bromine water oxidizes it into glucosamic acid, and nitric acid changes it into isosaccaharic acid.

If one takes this substance, which is nothing more than a transformation product of the protein, under the enzymic action in rubber, and heats it with sulphur at vulcanization temperature i. e. 135 deg. C. it is found to give birth to the following principal products:

(1) Hydrosulphuric acid.

(2) Sulfocyanic acid.

The hydrosulphuric acid characterizes itself readily, by lead acetate and nitroprussiate of sodium. The sulphocyanhydric acid is brought out by iron perchloride and proto salts of copper, which gives a non-soluble precipitate of copper sulphocyanate. Thus, the action of the resins and the proteins on the sulphur at vulcanization temperature gives birth to hydrosulphuric and sulphocyanic acids. The formation of the latter substance is not surprising, for it always comes when sulphur, azotated products and coal derivatives are heated together. It occurs, for instance, in water used for purifying coal gas. In this case also it is always accompanied by hydrossulphuric acid.

Character of the Acids

How can these two substances, which are surely due to the action of sulphur at 138 deg. C. on rubber containing a normal quantity of resins and proteins, react and thus cause the rapid vulcanization of the rubber and increase its tensile strength and, consequently, its polymerization?

Let us consider successively the character of each of these acids. Harries has finally agreed to the theories of Weber and Oswald by demonstrating that vulcanization happens in two phases: (1) An adsorption phase, during which the sulphur remains extractable with acetone and the rubber passes from a semi-stable to a stable form which is characterized by its non-solubility in hydrochloride (chlorhydrate) in chloroform; (2) A chemical phase, during which the adsorbed sulphur combines with the rubber, producing a poluprene sulphide which becomes inextractible by acetone.

By going back to the principles of colloidal chemistry, sulphur, to be adsorbed by a colloid like rubber, must itself be in a colloidal state S_2; but it is introduced into the mixture in a polymeric state S_x. It is, therefore, necessary to first break its aggregates and bring it to a colloidal state.

This transformation is easily brought about by heat, but it is slow and proportional to the mass acted upon. This explains why it is that by increasing the quantity of sulphur in compound the vulcanizing time is lessened. The hydrosulphur that was generated by the reaction of the resins and the proteins on the sulphur, makes it easier to obtain colloidal sulphur.

If sulphur is heated in the presence of air or of a substance containing oxygen, like oxidized rubber or a metallic oxide, a sulphurous acid and a sulphide, corresponding to the oxide used, are produced. This is the reaction that is always used with litharge and magnesia oxide which are good accelerators:

$$16\,PbO + 3S_x = 16\,Pb\,S + 8SO_2$$
$$16\,MgO + 3S_x = 16\,Mg\,S + 8SO_2$$

According to whether the thermic equation, corresponding to b in the chemical equation, is positive or negative, the reaction occurs more or less rapidly. With litharge, the equation is exothermic and releases—202 calories (calorie = heat necessary to raise the temperature of a kilogram of liquid water from 0 to 1 deg. C.); the reaction as it is demonstrated in practice is very rapid and the acceleration very marked. With magnesia, the equation is endothermic and requires—328 calories, but this inconvenience is compensated for by the large quantity of retained air contained in light magnesia. It is to this occlusion of air that magnesia owes its accelerating effect. With zinc oxide, the equation is clearly emothermic. This substance contains little or no retained air and acts as a mere filler, having no accelerating effect.

The same is true with most metallic oxides of which the thermic equation is negative; in the case of the formation of sulphurous acid.

In presence of hydrosulphuric acid the sulphurous acid thus created reacts, giving birth to colloidal sulphur and water:

$$SO_2 + (H_2S)_2 = 2\,H_2O + 3S$$

This is the classical reaction that is constantly applied in purifying coal gas for lighting purposes.

The formation of colloidal sulphur, which is capable of adsorption by rubber, is thus explained; the rapidity of its formation being proportionate to the rapidity of the formation of the sulphurous acid.

On the other hand, it must not be forgotten that sulphurous acid and hydrosulphuric acid are gases; they obey Graham's law and diffuse in the rubber mass at a speed that is universally proportional to the square root of their densities.

Technical Course in Rubber Manufacture*

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SECTION XX

Compounding

In this section it will be our aim to simply point out some of the general principles of this great game of compounding. Some of these principles are gained from scientific experimenting and some from what is commonly called practical experience. To say that more has been gained through one source than another would hardly seem fair, as each has profited from the other.

STOCK BINS AND COMPOUND BOXES

The art of compounding, for such it may be called, has developed in the last few years from the point where it was purely a rule of thumb to the extent that today men are trained in the science of compounding. In fact, we may go further and say that the large expenditure of money in the way of equipping laboratories and in hiring men to operate them, is simply for the benefit of the men who are in charge of the compounding. For instance, we may find in a laboratory several men whose whole time is given over to routine work in the testing of crude rubbers, and for what reason? That they may turn over some valuable information to the compounders. We find men, too, testing up the purity of the pigments, again to be of assistance to the compounders. Today we find the large laboratories establishing and prosecuting work of a research nature along the line of organic accelerators. This, again, is done with the idea of gaining some knowledge that in the hands of their compounders will enable them to develop greater speed in curing and thus to increase production.

Just the extent to which an organization is able, through its research facilities, to gain advanced knowledge, it progresses ahead of its competitors. It is interesting to note in this connection that a certain company, five years ago, boasted of the fact that they were spending $100,000 annually in research work and from the way this company has gone ahead we are safe in the assumption that today they are spending even more. Here the question may be asked, would any company make this expenditure if they were not realizing this amount in return?

It matters not in what particular line of work the compounding is being done, the same problems are ever before the compounder, whether he is engaged in compounding tires or toy balloons. The following points are all to be considered and each given its due attention:

1—Quality, including tensile strength, elasticity, grain, stretch, set, hardness, resistance to abrasion, to tearing, to cutting, deterioration due to ageing.

2—Adaptability of stock to the processes through which it must pass, such as milling, calendering and spreading.

3—Length of time and conditions required for vulcanization.

4—Compatibility with other stocks with which it is used.

As an example of this let us sight the different stocks which must be developed in the construction of a solid tire, where it is necessary to produce a stock which will form a union with a metal base on one side and with the soft vulcanized tread on the other:

5—Color.

6—Specific gravity.

7—Cost.

We shall now proceed to discuss these points as they bear upon compounding in mechanical goods, dipped goods, tires and hard rubber.

When it comes to the compounding for mechanical goods, the problem, with the exception of a few specials, presents itself in this manner. The compounder is advised of the terms as called for by the specifications in a contract which includes price, delivery, specific gravity, color, and usually definite tests to which the article must be subjected and pass. He will, therefore, take the material available and meet the specifications with as much margin of quality as the price will allow. It is to his advantage to make the time of cure as short as possible in order that the equipment may render the maximum possible production. Otherwise the conditions are the same as encountered in other stocks.

We shall therefore take each point separately for discussion.

Tensile Strength

Tensile strength is determined mainly by (a) the quality of the rubber used; (b) the balance between the rubber and other compounding ingredients. This embraces all there is to be said of compounding for in striking this balance, any or all of the properties in (1) are developed. Tensile strength is acquired mainly by the use of zinc oxide and different grades of lampblack. Several other materials effect tensile strength more

* This course commenced in the July 10, 1917, issue of THE RUBBER AGE AND TIRE NEWS.

or less, but these two are in a class by themselves.

Resistance to abrasion, to tearing, to cutting, etc., are very much allied to tensile strength, although the latter is by no means a measure of them. Zinc oxide is, beyond question superior to all other materials for obtaining these qualities, consequently one almost never finds a rubber compound that does not contain zinc.

Grain is another close ally of the properties just mentioned. It is desirable to produce a stock which will have a grain that is more or less knotted up and consequently will prevent easy tearing.

With very few exceptions, the addition of other compounding ingredients to the rubber tend to cut down the strength. In the case of certain materials, such as inner tubes, surgical goods, toy balloons, etc., the stretch is highly desirable and for this reason in their manufacture, very little filler may be used. Such as are used are mainly employed as coloring pigments. In this connection we might mention antimony, iron oxide, arsenic yellow, lampblack, litharge, and various organic pigments.

Occasionally where a cheap stock is desired, barytes may be used as a filler with very little effect upon the stretch; however, in the majority of uses for which a rubber compound is wanted, high stretch is undesirable. In tires, for instance, too high a degree of stretch would cause too much flexing resulting in inner friction which would cause the tire to go to pieces in a short time. No rule can be given for a proper balance in regard to this property since it must be worked out by actual experiment in each individual case.

Elasticity

Elasticity is measured inversely by the ratio of the work done in stretching to the work given back by the recovery. It is difficult to prophesy in advance just how a compound will conduct itself in this respect, except that most cheap fillers, like barytes, whiting, etc., have a tendency to decrease this ratio.

"Set" is nothing but an approximate measure of elasticity.

Ageing Qualities

The deterioration of rubber articles upon ageing is undoubtedly one of the most objectionable features. This deterioration may be due to several factors:

(a) Cure, either over vulcanization or under vulcanization.

(b) The quantity of sulphur present, either excess of deficit.

(c) Oxidation, which may be influenced by atmospheric conditions such as heat, light, humidity, alternate wetting and drying, gases in the atmosphere, or in special cases the influence of oils, or other chemicals which may come in contact with the rubber accidentally or of necessity, as in the case where hose is turned to conduct acids or oils. Here special compounding is necessary to produce a more resistant compound.

By adaptability to working on the mill or calender, we mean that the compound must not be too soft, neither must it be too dry. In certain cases precaution must be taken to produce stock that will not scorch too readily. Again, in the case of frictions, it is necessary to produce the desired degree of tackiness for frictioning. In the tubing machine, some stocks may be too dry and thus come through rough; some may swell unevenly after coming through the die of the tubing machine. Some stocks will give trouble due to blooming when being calendered. This will cause poor unions in case it is used in laminated fabrications. Thus if the stock is soft, either add some filler or remove some of the softeners. If too dry the reverse of this will undoubtedly prove the remedy. Mineral rubber, vaseline, pitches, tar and cheap wild rubbers, and vegetable oils may be used for these purposes.

In a large number of cases it is necessary to cure two or more stocks of different nature together. The cure of each of these stocks must be regulated so that both will be cured properly during the same length of time. We will take, for example, solid tire stocks. Here the volume of rubber is so great that there is a tendency for the outside to cure more rapidly than the inner part unless the time of vulcanization is long enough to permit the whole mass to acquire the same temperature and remain at this temperature long enough so that the time to heat through and to cool off in the center will approximately balance. Then, again, where tires are vulcanized by the two-cure process, the carcass gets a fair degree of cure in the first heat but must retain the property of holding its shape and at the same time that of uniting with the tread rubber during the second cure. The tread rubber on the other hand must take a "set" cure very quickly and be able to hold its shape and form a union with that already in the carcass. These properties may be obtained by proper manipulation of the sulphur content and by the use of suitable accelerators.

Colors

The next point is that of color. Here the compounder is either asked to duplicate a certain stock as to color or to produce a stock of certain color. This is a point which is most important in mechanical goods. Of course, the trade may become prejudiced in favor of a certain color in treads or a certain color of inner tubes, but the choice is limited to a very few shades, while in the case of balloons, variety of tints is to be desired. The number of colors available when only inorganic fillers were used restricted the selection very much, but today with the use of organic dyes many different shades and tints are possible. When compounding to match a certain shade, one often encounters difficulty for it cannot always be foretold just effect the process of vulcanization is going to have upon the particular color pigments which are added, and especially is this true of certain organic ones.

Specific Gravity

Very often the compounder is asked to produce a stock of a certain specific gravity. This is done by having at hand a knowledge of the specific gravities of the different materials used in compounding. In this connection we will give an example. For instance, it is desired to produce a stock having a specific gravity of 1.59. Let us assume that the purpose for which this stock is to be used will allow the compounder to use fine Para,, zinc oxide and sulphur. This is a very simple formula but the principle may the better be grasped from it. The compounder arranges his data in the following manner:

Material	Weight	Specific Gravity	Volume	Cost	Cost of Weight
Fine para	50	.89	56.1	$.81	$40.50
			x		
Zinc oxide.....x =	(54.9)	5.35	5.35	.10	5.49
Sulphur	3	1.98	1.51	.04	.12
	107.9				$46.11

Conclusion

From his experience he concludes that he will use 50 parts of rubber with a specific gravity of .89, and to cure this three parts of sulphur with a gravity of 1.98. The question that remains is to determine the amount of zinc oxide necessary to give the stock a gravity of 1.59. In other words, the amount of zinc oxide is an unknown quantity, but has a gravity of 5.35.

Now the volume $= \frac{\text{Wt.}}{\text{Sp. gr.}}$ therefore, the volume of rubber is equal to $\frac{50}{.89} = 256.1$. The volume of zinc oxide is equal to $\frac{x}{5.35}$ and the volume of sulphur is equal to $\frac{3}{1.98} = 1.51$. Now the total weight of the compound as taken is $50 + x + 3 = 53 + x$ and its gravity $56.1 + \frac{x}{5.35} + 1.51 = 56.61 + \frac{x}{5.35}$, and since Vol. $= \frac{\text{Wt.}}{\text{Sp. gr.}}$ $\therefore$ Sp. gr. $= \frac{\text{Wt.}}{\text{Vol.}}$. Wt. $= 53 + x$; Sp. gr. $= 57.61$.

Thus 1.59 (the desired gravity) $= \frac{53 + x}{57.61 + \frac{x}{5.35}}$.

Therefore $x = 54.9$ parts of zinc oxide necessary to fulfill the above conditions.

Volume Cost

From the same problem we may illustrate what is meant by volume cost in compounding. Filling in the costs and quantity of zinc oxide in our data we find that 107.9 pounds of this stock will cost today $46.11, therefore, the cost of one pound will be $.427. This stock has a gravity of 1.59, therefore, a cubic foot of it will weigh 62.4 (a cubic foot of water) times 1.59 or 99.216 pounds. We have already determined the cost per pound to be $.427, therefore, the cost of a cubic foot or volume cost, as it is termed, will be $.427 times 99.216 or $42.36.

From the above example the method of compounding with reference to cost will also be illustrated. If the volume cost must be necessarily low, then cheap rubber and pigments must be used. If on the other hand, quality is not to be sacrificed for cost, then better materials may be employed. In this connection, however, a compounder is able to save large sums of money for his company, where he is able to produce a quality equal to or better than their competitors at a lower volume cost. Experience here is a valuable asset. A wide experience and knowledge of fillers and rubbers, with a clear understanding as to what may be accomplished with each one, constitutes the requisite for a good compounder. Let us point out just a few of the many troubles that must be guarded against. First, some dirt may get into the compound, either through the fillers in their handling, or in the rubber itself, and as a result many dollars' worth of goods may be lost. This is especially true in the case of compounds which contain a high rubber content, like tubes or band stock. The rubber will not adhere to the dirt particles during vulcanization, and when finished and the rubber is stretched it separates from the foreign body and this leaves a hole and weakens the goods at this point.

Second, moisture to any extent in any of the materials used in a stock is very objectionable. If moisture is present when the stock goes into the vulcanizers and is heated above the boiling point of water, this enclosed moisture will exist in the gaseous condition and cause "blowing" or the making of the stock porous. Again, it may come out toward the surface and there cause blistering"; again, it may discolor white stocks, and, again, if present in fabric, it will cause poor unions in tire construction.

Third, if the fillers contain any lead compounds or the batch pans from a previous stock, and these happen to find their way into what is supposed to be a white compound, they will discolor it.

Fourth, great care must be exercised and close vigilance kept of what is going on in the compounding room. Should the wrong kind or the wrong amount of material be used or a certain material be left out of a compound, it will be liable to throw that stock out in cure, color and gravity, thus rendering it unfit for the purpose for which it was to be used.

Scorching

Fifth, scorching on the mixing mills, calender or tube machines is usually due to forcing the stock to run faster than it should, too high temperature, too much speed or insufficient warming up. Quick curing stocks especially suffer from these causes. The best way to get them plastic so that they will run through other processes more easily, is on the mixing mills before any powders are added, or, in other words, be sure rubber is well broken down.

Sixth, what is termed "tough stock" is generally caused from insufficient milling of the rubber before adding the fillers. Then, too, some compounds have a tendency to toughen on long standing. Some stocks may come off from the mill in a good condition, but before the heat, caused in mixing, has had time to radiate out, the rubber piled in bins thus trapping the heat, and there will take place a certain degree of vulcanization. The result is similar to tough stock, but is really a scorched condition.

Seventh, a lumpy stock may be produced in several ways. For instance, the presence of dirt, as mentioned above, may cause it; or lumps which occur in shoddy which has not been evenly reclaimed or refined; then, too, the mixing of tough stock or scorched stock with a soft compound may be responsible.

Eighth, sulphur bloom on uncured stock, such as friction and cover stock, may be due to using tough or scorched stock, insufficiently "warmed up" stock, too high a temperature on the calender, and, under some conditions, too low a temperature.

Ninth, poor union of stocks may be due to some incompatibility of the stocks to be joined, improper preparations of stock in mill rooms, dirt, moisture, soapstone, or anything which may affect the tacky surface of the rubber, incompletely dried cement, or poor local workmanship.

Tenth, porosity of the cured stock may be due to moisture as mentioned above, insufficient pressure, under cure, or improper compounding.

Eleventh, surface pitting is closely related to porosity or blowing, and is caused by air trapping, surface, moisture, or perhaps the same causes which produce porosity.

Twelfth, improper cure is a thing which must be closely watched. If a sample is over-cured it cannot be brought back for the process of vulcanization and is not reversible, as pointed out when we discussed reclaiming. Over-cured stock may or may not lack in tensile strength, but it always lacks in stretch, is always short grain and ages very poorly. On the other hand, under cure lacks in tensile strength, resiliency and generally in aging properties. Therefore, the vulcanizing must be closely checked.

Thirteenth, as mentioned above, it is difficult to match certain shades of color due to variations of materials used.

In this section we have tried to present a few of the many phases encountered in what is termed compounding.

Akron Salvage Board Formed

Akron will be the first American city to establish a co-operative salvage office in an effort to comply with the request of the Commercial Economy Board of the Council of National Defense, to conserve all waste.

Preliminary plans for this work have begun at the Akron Chamber of Commerce. George W. Sherman, of The B. F. Goodrich Co., has been appointed chairman by C. W. Seiberling, president of the Chamber of Commerce.

The committee met on April 5, with a number of representatives from smaller business concerns in Akron to form an organization, which through private subscriptions will employ a manager and form permanent headquarters to take up the work.

W. D. MOFFAT
PRESIDENT

W. I. SEAMAN
TREASURER

GEORGE NEWBOLD
BUSINESS MANAGER

THE RUBBER AGE AND TIRE NEWS

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THE seemingly well founded rumor that there is to be a large curtailment in the imports of crude rubber has caused no surprise to those who have been following the situation closely. In fact it has been expected, and many of the large manufacturers have anticipated their wants by laying in large stocks.

Rubber was produced last year in greater quantities than ever before; the requirements of European manufacturers due to war conditions were below normal; prices of the raw product became very attractive and American manufacturers had the money with which to buy. They bought far in excess of current needs and now when curtailment seems imminent, it is reported by a leading authority that there are in the neighborhood of seventy thousand tons of crude rubber in the country and in transit.

With stocks of this size practically on hand there seems to be little cause to fear the result of restricted imports for some time to come—particularly when it is considered that this seventy thousand tons will keep American factories in full operation for several months without resorting to new compounds, and that during this period a steady but restricted supply will continue to arrive.

In a few days the War Trade Board will announce the restrictions it deems necessary and then manufacturers will have opportunities for intelligently laying their plans to meet the new conditions. They may then consult their old note books and dig up old formulas that call for a little less crude rubber but have other excellent ingredients to give strength and durability; they will give the reclaimers an opportunity they have long been looking for; the manufacturers of substitutes will welcome the new conditions, and the effect on the entire trade will not be such as to cause apprehension.

In connection with the curtailment of crude rubber, it is not out of place to call attention to the negotiations now in progress to still further restrict the manufacture of pleasure automobiles. According to press accounts, Washington is planning to order a further reduction of 75 per cent in the manufacture of these vehicles. Whether such a large reduction is yet necessary is not known, but it seems sure that next year there will be a small production of non-essential cars. In any event, there will continue to be a steady demand for tires for replacement unless the unnecessary use of gasoline be restricted.

It is gratifying to learn that the representatives of the rubber industry who met in the conference with the Shipping Board displayed the broadest patriotic interest and offered to make any sacrifices deemed necessary to win the war.

The Liberty Loan

Appeals have been made to the various special Liberty Loan Committees throughout the country to work harder, and the response of the rubber industry has been splendid; but there must be no let up of effort.

These are critical days. Our Allies are fighting desperately to hold the enemy back. The armies of England and France today are "battling with their backs to the wall." They are buoyed up with one hope, and that is that the United States is coming to take her place beside them, and to give her strength to beat the foe.

No one can tell what will follow if the armies of Prussia break through. No one knows the price to be charged if the Teutonic forces are victors.

America is called upon to give to the fullest, of men, of energy and of money. There must be no holding back, and now or never all must give to the Government all that it asks.

"Men and women of the American rubber industry, it's up to you"—this message must be heeded.

The rubber industry will not be found wanting when this Third Liberty Loan campaign is over. It should show the world that, from this industry, came the greatest number of individual bond buyers. One hundred per cent of subscribers in every rubber firm should be the steady aim.

Those who have not bought all the bonds they can, should DO IT NOW. Don't wait until tomorrow. And remember this: America's sons are "Over There." The enemy is using every known means, fair and foul, to kill them.

Promotion of Rural Motor Express Lines

While rumors of the restriction of crude rubber imports and the curtailment of automobile production are being freely discussed, it is encouraging to note that the Council of National Defense has urged upon the State Councils that rural motor express lines to connect the farms with the cities should be promoted in order to facilitate the transportation of foodstuffs to consumers.

The plan that is encouraged is the "Return Loads System" by which farmers ship their various farm products to the city and the truck returns loaded with the supplies that the farmer requires for his work. This new system, which is economical in labor because it allows one man with one truck to do the work formerly accomplished by five, provides for a direct and considerable saving in man power, now so badly needed for farm work, and would thus permit the cultivation of more acreage than is otherwise possible.

Cut in Rubber Imports Expected

A reduction of something like 50 per cent in crude rubber imports is expected to be announced within the next few days. Rubber importers were called into a conference with Shipping Board officials at Washington on Thursday, April 18. The meeting was confidential, but some details of the happenings were made public by a news gathering agency, and it can be stated the rubber importers were informed that the action intended in connection with crude rubber was only one item of a "Second Embargo List" which is to go into force on May 13, and which will consist of many articles that can be imported into the United States only from Canada and Newfoundland, except as specifically provided for in the licenses already required for all importations.

Previous import restrictions have applied chiefly to luxuries, whereas the new list will curtail the importation of some articles which rank as necessities of life, and will include crude rubber.

According to information gathered in the trade, the crude rubber importers who met Shipping Board officials in conference at Washington were told that the Government was faced with the necessity of conserving cargo space for war needs; that unnecessary imports already had been restricted and steps taken to prevent the use of cargo space for bringing luxuries and non-essentials into the United States; but that this had not rendered the full relief desired, so it was the intention of the Shipping Board to ask the War Trade Board to restrict the importation of other commodities which, though ranking as essentials, might be curtailed in their usage.

In response to the explanation of the situation by the Shipping Board officials, it is understood that the rubber importers announced their intention of doing all possible in their power to assist, and that these importers laid before the Government officials a fairly definite program of what they believed could be done to save cargo space by curtailing crude rubber importations. The data left by the rubber importers, it is said, is now in the hands of the War Trade Board and is being carefully studied by this body.

Fifty Per Cent Reduction Probable

It was stated at the offices of the War Trade Board in Washington that no conclusion had been reached and that before they would take up the matter for definite consideration another conference with the representatives of the rubber trade would be held this week in New York City. The exact date for this meeting could not be stated.

Leading rubber men to whose attention the War Trade Board's statement was brought said that they believed the New York conference would probably be little more than a formal meeting.

At the offices of the Shipping Board in Washington it was stated to the Washington editor of THE RUBBER AGE AND TIRE NEWS that the proceedings were confidential and that it had been agreed that nothing would as yet be made public in regard to the matter. The news gathering agency spread the story without authorization, and a letter of reprimand had been sent to the agency in question.

As matters now stand nothing definite is known, but the general impression in the trade is that crude rubber imports will be restricted by something like 50 per cent.

Rubber importers interviewed by representatives of THE RUBBER AGE AND TIRE NEWS stated that there was talk of the restrictions on imports being only tentative and limited to ninety days to be changed or renewed at the end of that period. Others believe that the curtailment will continue for at least a year, during which period total imports will be not more than 100,000 tons.

In view of the fact that about 190,000 tons of crude rubber were brought into the United States during the year 1917, the allowance of 100,000 tons expected by these importers would amount to a reduction of nearly 50 per cent in these imports.

During the past five years, imports of crude rubber into the United States have increased about 400 per cent. Inasmuch as the automobile industry has curtailed its output, some rubber importers said they were not surprised at the action of the War Trade Board in conserving ship tonnage by restricting rubber imports.

Another opinion expressed by representative rubber importers is that the War Trade Board will refuse licenses to importers of Middle East plantation rubber with the object of forcing Pacific Ocean shipping to seek charter in the Atlantic trade where bottom space is badly needed. It is not believed that crude rubber importations from South America will be interfered with for the time being at least.

Still another opinion expressed in the trade was that the Government would probably fix maximum prices for crude rubber to prevent inflation of values, and that the total imports for the year starting May 13 would be limited to 100,000 tons, to be distributed as follows:

Government needs	37,000 tons
Rubber footwear	16,000 tons
Solid tires	25,000 tons
Mechanical rubber goods	12,000 tons
Cables and insulating	10,000 tons
Total	100,000 tons

If this latter opinion is correct no provision is made for rubber to be used in the manufacture of pneumatic tires and manufacturers would be left to use up for this purpose the supplies of crude rubber they have on hand and in transit.

An Excited Market

The effect of the reports from Washington was to greatly excite the New York crude rubber market on Friday and Saturday and create a heavy demand from both manufacturing consumers and dealers. Many of the latter bought freely to cover short sales. It has been impossible to obtain particulars of transactions but it is known that the volume of business was very large at rapidly advancing prices. Some consumers probably received advance information from Washington on Thursday for a large volume of business was reported during the closing hours on that day at prevailing prices of 60 cents for plantation grades. Friday business was entirely upset and no sellers were in the market. First latex and smoked sheets ribbed were quoted nominally at an advance of five cents a pound, and fine Para rubber was held at from 63 to 65 cents, while the coarse grade was quoted at 38 cents. No importers are willing to quote on future shipments and the futures market must be considered entirely nominal.

There is apparently no immediate cause for apprehension. Practically all large factories, according to reports, have large stocks of crude rubber in storage; there are abnormally large quantities of rubber afloat bound for this country and in transit between Pacific ports and the rubber centers.

The general impression is that manufacturers are not disposed to buy at increased prices at this time.

Officials of the Rubber Association of America approached by representatives of THE RUBBER AGE AND TIRE NEWS refused to make any statements or comments concerning the impending restrictions, the primary aim of which undoubtedly is to transfer available bottoms from the Pacific to the Atlantic trade.

U. S. Requirements for Rubber Footwear

War Department Specifications for Short Rubber Boots, for Hip Rubber Boots and for Four-Buckle All Rubber Gaiters Given Out by Quartermaster's Buyer of Rubber Goods

The Shoes, Leather and Rubber Branch of the Supply and Equipment Division of the Quartermaster General of the Army, 1800 Virginia Avenue, N.W., Washington, D. C., adopted April 12 the following specifications for rubber footwear. They were signed by Major Gen. Geo. W. Goethals, Acting Quartermaster General, and have been sent out by W. E. Piper, buyer of Rubber goods:

SPECIFICATION FOR SHORT RUBBER BOOT

1. Standard Sample—Each manufacturer shall submit for approval to the Quartermaster Corps two sample pairs of boots representing the design and materials to be used on boots delivered on contract. Upon approval, one of these boots shall be tagged wth an approval tag sealed to the boot and immediately returned to the manufacturer before work on the contract is begun.

2. Rubber Compound—All rubber compounds used in the construction of these boots shall be those in regular use by each manufacturer for the construction of his "extra" or "super quality" goods (so known to the trade). Each manufacturer shall, moreover, submit to the Quartermaster Corps an affidavit that these compounds, or their equivalents, have been used in the production of his "extra" or "super quality" goods for a period of at least two years previous to the contract and that these goods have given satisfactory service.

3. Lasts—All boots furnished under these specifications shall be made over each manufacturer's regular boot trees.

4. Measurements—Measurements shall be based on boot size 9.

(1) Height—The height of boot inside of back shall be not less than 15 in. The height of boot inside of front shall be not less than 16 in.

(2) Girth—The circumference at the calf of the boot tree over which the boots are made shall be not less than 16½ in.

5. Weight—The weight of the boot, finished and ready for shipment, shall be not less than 5 lb. per pair, size 9.

6. Finish—Boots are to be black throughout, dull finish, and not varnished. No colored trademark labels over 1½ in. in diameter and not more than one on each boot.

7. Leg and Toe Linings—Leg and toe linings shall be made of cotton fabric, weighing not less than 35-100ths lb. per sq. yd., frictioned and even motion coated.

8. Leg Form—Leg forms shall be made of cotton fabric weighing not less than 31-100ths lb. per sq. yd., which shall be frictioned on both sides.

9. Vamp Forms—Vamp forms shall be made of cotton fabric weighing not less than 31-100ths lb. per sq. yd., which shall be frictioned on both sides.

10. Inner Vamp Construction—The cotton fabric used for inner vamp shall weigh not less than 35-100ths lb. per sq. yd. and shall be frictioned on both sides.

The gum inner vamp if used without friction shall be a sheet of rubber compound not less than 15-1000ths of an in. thick.

Boots shall contain at least one of these inner vamps, may contain both. A rubber toe strip not less than 25-1000ths of an in. thick shall be used.

11. Counter Form—Counter forms shall be made of cotton fabric weighing not less than 31-100ths lb. per sq. yd., which shall be frictioned on both sides.

12. Front and Back Stays—These stays shall be made of cotton fabric weighing not less than 31-100ths lb. per sq. yd., which shall be frictioned on both sides. If preferred, a cloth ankle piece of the same frictioned fabric may be substituted for the front and back stays. Front stay to extend to top of leg cover.

13. Gum Leg Covering—The leg cover shall consist of rubber compound not less than 25-1000ths of an in. thick.

14. Gum Vamp—The vamp cover shall consist of rubber compound not less than 30-1000ths of an in. thick.
of an in. thick.

15. Gum Counter—Counter cover shall consist of rubber compound not less than 25-1000ths of an in. thick.

16. Gum Ankle Piece—The gum ankle piece shall consist of a rubber compound not less than 15-1000ths of an in. thick. It must extend to top of leg cover at front of boot.

17. Gum Binding—A binding shall be placed around the top of the boot on the outside in order to give a finished appearance.

18. Smooth Sole—The smooth sole shall consistsist of rubber compound not less than 60-1000ths of an in. thick.

19. Tap Sole—The rubber tap sole shall be of the design known as "Spading" and shall cover the shank of the boot, and extend completely under heel.

The tap sole shall weigh not less than ⅜ lb. per pair, size 9.

20. Heels—The heels shall be not less than ⅝ of an in. thick at the thinnest point and shall adhere firmly to the gum sole. If necessary to insure proper adhesion, a heel cover not less than 2-100ths of an in. thick may be used between the heel and gum sole.

21. Insole—The insole shall be lined with cotton fabric weighing not less than 35-100ths lb. per sq. yd., frictioned, backed with rubber compound or fiber stock with coating of rubber compound.

22. Sole Form—The sole form shall be made of cotton fabric weighing not less than 31-100ths lb. per sq. yd., which shall be frictioned on both sides.

23. Stiffening Soles—To give the necessary stiffness to the bottom of the boot, stiffening soles shall be used. The total thickness of such parts, including the stiffening compound on the insole if used, shall be not less than 20-100ths of an in.

24. Counter—A stiffening counter shall be provided which shall consist of a cotton fabric weighing not less than 15-100ths lb. per sq. yd., which shall be frictioned and then coated with a stiffening compound. The counter complete shall be not less than 6-100ths in. thick.

25. Pull-on—Boots are to be fitted with knob pull-ons.

26. Gum Heel Stay—A gum heel stay made from the same rubber compound as used for the outsole, not less than 25-1000ths of an in. in thickness shall be placed between the lining and counter of the boot.

27. Having in mind the difficulty that would arise in factory manipulation if the Quartermaster Corps required a vniform detailed specification from all manufacturers, and in consideration of the Quartermaster Corps accepting goods manufactured under this very broad specification, it is required that each manufacturer shall within thirty days of beginning manufacture make up a statement of detailed material and labor cost for each article of rubber footwear on which he receives Government orders. This detailed cost shall be figured:

(a) At the actual prices paid for all materials.

(b) At the arbitrary prices of raw materials (at approximate market conditions) furnished by the War Service Committee of the Rubber Industry of the U. S. A., Boot and Shoe Division.

The total of these detailed costs shall show the material and labor costs on a dollar of selling value per pair of merchandise sold to the Government. These costs shall be sworn to by a proper officer of the company, and remain on file at the office of the company. These costs shall be available to the purchasing and inspection chiefs of the Quartermaster General's office in Washington, or to a properly authorized representative. It is understood that to substantiate the correctness of the material and labor costs access shall be given at the office of the company to proof of prices paid for materials, the record of calender runnings, compounds, and all other information necessary to check up the accuracy of the figures. These figures will be corrected from time to time upon request of the Quartermaster Corps.

SPECIFICATION FOR HIP RUBBER BOOT

To be the same as specification for short rubber boot, except that the following paragraphs, No. 28 to 34, inclusive, shall be added:

28. Top or Skirt—The top shall consist of cotton fabric weighing not less than 43-100ths lb. per sq. yd., frictioned with a good quality of rubber compound, one side of which shall be completely rubber surfaced.

The seam of the top shall be at the back or on the outside of the leg.

29. Knee Patch—There shall be a knee patch of rubber compound, which shall be not less than 50 sq. in. in area and 20-1000ths of an in. thick.

30. Top Buckle and Strap—Each boot shall have fastened to the top on the outside of the leg, a boot buckle at least 1⅛ in. wide. With each boot shall be furnished an adjustable strap made with a loop at one end, through which may be slipped the belt of the wearer.

When finished this strap shall be not less than 10½ in. long and not less than 13-16ths of an in. wide. It shall consist of cotton fabric, frictioned on both sides and surfaced with rubber compound. The fabric shall be double. The loop at the end of the adjustable strap shall be securely fastened and shall be large enough to permit easy passage of a belt 2 in. wide. Sample will be furnished by Quartermaster Corps.

31. Measurements—The extreme height of the hip boot inside shall be not less than 34 in.

The crotch height inside shall be not less than 29 in.

The extreme girth of the boot, measured around the boot inside of the crotch, shall be not less than 23 in.

32. Pull-ons—Tug straps may be used on hip boots, in place of the knob pull-ons used on the short boot.

33. Ankle Strap—Each boot shall be provided with an ankle strap. This strap shall be not less than 13-16 in. wide, made from a heavy cotton fabric, weighing not less than 11½ oz. per sq. yd., double frictioned, and surfaced with a good grade rubber compound. The fabric shall be two-ply. A boot buckle not less than 1⅛ in. wide shall be securely fastened and riveted to one end. The strap shall be not less than 32 in. long for size 9. The strap shall be strong enough to stand any reasonable pull when used for the purpose for which it is intended. A standard sample will be furnished by the Quartermaster Corps.

43. Ankle Strap Guide—An ankle strap guide made from the same stock as used for the ankle strap shall be securely vulcanized to the outside of the rubber counter at the back of the boot. The opening in this guide shall be lined with a cotton fabric to prevent its adhering during vulcanization. The guide shall be ⅞ in. wide, the opening 1½ in. long, and sufficiently large to allow strap to be adjusted easily. The middle of the ankle strap guide shall be approximately 4 in. from the bottom edge of the heel of boot size 9. A standard sample of this ankle strap guide will be furnished by the Quartermaster Corps.

SPECIFICATION FOR 4-BUCKLE ALL RUBBER GAITER

1. Standard Sample—Each manufacturer shall submit for approval to the Quartermaster Corps two sample pairs of gaiters representing the design and materials to be used in shoes delivered on contract. Upon approval, one of these shoes shall be tagged with an approval tag sealed to the shoe and immediately returned to the manufacturer before work on the contract is begun.

2. Rubber Compound—All rubber compounds used in the construction of these shoes shall be those in regular use by the manufacturer for the construction of his "extra" or "super quality" goods (so known to the trade). Each manufacturer shall, moreover, submit to the Quartermaster Corps an affidavit that these compounds, or their equivalents, have been used in the production of his "extra" or "super quality" goods for a period of at least two years previous to the contract and that these goods have given satisfactory service.

3. Lasts—All shoes furnished under these specifications shall be made over what is known as regular broad-toe full-width last used by each manufacturer. Model to be approved by Quartermaster Corps. Shoes must fit over Army marching shoe, No. 1269, D width, size for size.

4. Height—Average height of gaiter to be not less than 10 in. outside at back.

5. Weight—The average weight of finished gaiter ready for shipment shall not be less than 3⅝ lb. per pair, size 9.

6. Vamp and Quarters—Vamp and quarters shall consist of cotton fabric weighing not less than 35-100ths lb. per sq. yd., which shall be frictioned on both sides.

The outer surface shall be covered with a rubber compound at least 3-100ths in. in thickness.

The vamp and quarters shall be lined with a cotton fabric not less than 35-100ths lb. per sq. yd., frictioned and even motion coated.

7. Finish—The gaiter is to be black throughout, dull finish, and not varnished. No colored trademark labels over 1½ in. in diameter are to be used, and not more than one on each shoe.

8. Bellows or Pockets—The vamp and quarter shall be joined by a bellows or pocket of cotton fabric weighing not less than 35-100ths lb. per sq. yd., and shall be frictioned on both sides and covered outside with a rubber compound to exclude water.

The pocket shall be lined with a cotton fabric weighing not less than 31-100ths lb. per sq. yd.

9. Counter—A stiffening counter shall be provided, which shall consist of a cotton fabric weighing not less than 15-100ths lb. per sq. yd., which shall be frictioned and then coated with a stiffening compound. The counter complete shall be not less than 6-100ths in. thick.

10. Back Stay—A suitable back stay shall be provided.

11. Insole—The insole shall be not less than 120-1000ths of an in. in thickness, made from the same compound as used for the outsole backed on the lasting side with a cotton fabric weighing not less than 31-100ths lb. per sq. yd.

12. Sole—The sole shall be a full double plain edge sole known to the trade as a "railroad sole," consisting of:

1st. A sole form of cotton fabric weighing not less than 25-100ths lb. per sq. yd., to be frictioned on both sides.

2nd. A smooth sole of rubber compound at least 6-100ths in. in thickness, cut to extend above the lower edge of the upper, when in position.

3rd. An outsole of rubber compound, thickened at the heel and weighing not less than 6-10th lb. per pair (size 9).

13. Buckles—Each shoe shall be fitted with four buckles securely fastened to the gaiter.

14. Having in mind the difficulty that would arise in factory manipulation if the Quartermaster Corps required a uniform detailed specification from all manufacturers, and in consideration of the Quartermaster Corps accepting goods manufactured under this very broad specification, it is required that each manufacturer shall within thirty days of beginning manufacture make up a statement of detailed material and labor cost for each article of rubber footwear on which he receives Government orders. This detailed cost shall be figured:

(a) At the actual prices paid for all materials.

(b) At the arbitrary prices of raw materials (at approximate market conditions) furnished by the War Service Committee of the Rubber Industry of the U. S. A., Boot and Shoe Division.

Important News Items of the Rubber Trade

The Third Liberty Loan in New York City—Americanization of Foreign Employees in the Rubber Industry—Rubber Consumption of Various Branches of the Industry—Republic Rubber Elections

The Liberty Loan in New York

The Special Liberty Loan Committee of the Rubber Industry during the first two weeks of the drive has secured subscriptions in Greater New York to the amount of $2,805,000. On account of the territory being restricted to Greater New York and divided into trades committees, it has been impossible to secure the subscriptions through this committee from many who subscribed through the rubber industry without geographical limitations, to the Second Liberty Loan. Several of those who contributed most heavily to the second loan are located outside of Greater New York or are more closely identified with other industries. The territory of Greater New York has been thoroughly and systematically covered by a force of thirty salesmen organized by this Committee, and most of them report that they have subscriptions held pending the action of the companies.

The largest subscription received through this Committee so far is from the United States Rubber Co.—$1,500,000. A short list of other large subscribers is as follows: The B. F. Goodrich Co., $500,000; U. S. Rubber Reclaiming Co., $65,000; B. G. Work, $25,000; H. E. Raymond, $25,000; H. E. Raymond, $25,000; Hodgman Rubber Co., $25,000; Max Lowenthal, $25,000; the Rubber Association of America, Inc., $25,000; Charles T. Wilson & Co., Inc., $15,000; Parker, Stearns & Co., $10,000; Bishop Gutta Percha Co., $10,000; E. H. Garcin, $10,000; Raw Products Co., $10,000; Arthur H. Marks, $10,000.

This Committee has been rated in Class A, which specifies a minimum of $10,000,000. It is, therefore, evident that rapid and energetic work and full coöperation on the part of all of the trade in New York will be necessary to attain this figure.

In the Liberty Loan parade scheduled for Liberty Day, April 26, the principal feature of the parade will be the large United States flag, purchased by subscriptions of Goodrich employes, and claimed to be the largest American flag in the world. This flag, 50x75 feet in size, will be carried by sixty men, each one of whom has purchased a Liberty Bond. The flag has been brought on from Akron, Ohio, for this purpose through the efforts of Bertram G. Work, chairman of the Committee.

The point has been made that any firm having New York representation may add its amount to the total placed through this Committee. It is desirable, therefore, that intending subscribers promptly advise the Committee of the amount of their subscriptions and state the source through which it is made, in order that they may be properly represented in the Greater New York Division of the industry.

Republic Rubber Elections

Robert Bentley and M. I. Arms have been elected directors of the Republic Rubber Corp., succeeding J. T. Harrington and J. C. Wick, respectively.

Americanization Plans

The Rubber Association of America has given out the following report of a meeting held recently at the Department of the Interior, Washington, D. C., which was attended by a representative of the Rubber Association.

The object in making public this report is the hope that it may result in progressive action by American rubber manufacturers on this unquestionably very important matter. It is suggested that the members of the Rubber Association can assist in this work by using all possible efforts to see that there are suitable day and night schools provided by the local Board of Education in each rubber community, affording an opportunity to foreigners to learn the English language. The time of meeting of these classes could be so regulated as not to interfere with the employes' duties in the rubber factories. The report follows:

A representative of the Rubber Association of America recently attended a meeting of the Department of the Interior at Washington, called by the Hon. Franklin K. Lane, Secretary of the Interior, at which all of the leading manufacturing interests of the country were represented by executive heads; also, the presidents of the various mercantile associations of the country and the Governors of some fifteen States of the Union were present.

The necessity of the education and Americanization of the foreign-born was the keynote of the meeting. This necessity has been emphasized by the war in two ways: First, by the large number of recruits drafted under the compulsory recruiting law who are so ignorant of the English language as to make the receipt and transmission of orders through them an impossibility except in a foreign language; second, by reason of the recent situation in Russia. It seemed to be the tenor of the meeting that Socialism and the doctrine preached by the Bolsheviki would find a very fertile field in this country in the communities where the English language and our American ideals are lacking.

The meeting touched very largely on the teaching of English in the schools, particularly in the primary grades, to the exclusion of all other languages, and the propriety of eliminating the German language in all grade schools, treating it solely as a cultural study for high schools and colleges.

The German newspapers also came in for considerable amount of attention at the hands of the various members attending the meeting, and it was quite evident that there was quite a variation of opinion as to the proper method to be adopted in handling the German newspaper problem.

The outcome of the meeting was a set of resolutions as follows:

1. The adoption of the policy that the Federal Government should cooperate with States and through the States with the local communities in carrying on an extensive, intensive and immediate program of Americanization through education, especially for non-English-speaking foreign-born adults.

2. That the industries employing large numbers of non-English-speaking foreign-born persons should cooperate with local communities, State and Federal governments in carrying out this proposition.

3. That adequate appropriations should be provided by the Congress to be expended through appropriate governmental agencies for the foregoing purpose.

4. That in all schools where elementary subjects are taught they should be taught in the English language only.

In several instances both the Secretary of the Interior and other speakers touched on the assistance that industry could give to this propaganda.

There are very definite ways in which the Rubber Association, through its individual members, can cooperate. If, for instance, the proper opportunity is provided for our foreign-born employes to learn rudimentary English, the incentive to have them do so can best be applied by ourselves in the way of an instant and proper recognition of the increase in the value of such foreigners in our employ who take the trouble to learn the English language. On purely economical grounds we could well afford to do this on the basis of the increase in value of the employe who can receive and give orders in the common tongue.

Industry's Consumption of Rubber

The Rubber Association has given out the following totals from replies received from 448 manufacturers to the War Service Committee Questionnaire No. 1 out of 503 copies sent out:

The fifty-five manufacturers who failed to respond, in the aggregate, used very little rubber. This report is, therefore, considered substantially correct and represents the amount of crude rubber used in the various rubber industries.

In addition to this the production of eighteen manufacturers of reclaimed rubber is noted, together with the total amount of sulphuric acid consumed by manufacturers and reclaimers:

Amount of rubber (crude and reclaimed) used in the production of specified classes of goods:

	Pounds used during calendar year ending Dec. 31, 1917.	
Class.	*Crude.*	*Reclaimed.*
Tires and tubes:		
Automobile pneumatic casings	160,527,867	31,920,927
Automobile pneumatic tubes	32,315,758	211,696
Motor and bicycle tires & tire sundries.	6,305,449	6,199,427
Solid tires	26,176,513	6,789,200
Casings and tubes combined	19,673,218	1,848,438
Casings, tires and tubes combined	2,022,428	83,481
Total	247,021,233	47,053,169
Mechanical rubber g'ds	47,765,284	75,338,450
Boots and shoes	28,377,019	35,342,989
Insulated wire and insulating compounds.	5,953,205	18,974,503
Druggists' and stationers' sundries and surgical rubber goods	8,359,937	394,004
Waterproof clothing, including carriage cloth and rubber sheeting.	3,562,833	11,694,326
Waterproof cloth, including single and double texture	1,310,694	999,289
Hard rubber goods	2,610,544	4,845,968
Rubber cement	3,275,676	18,663
Miscellaneous, not included in any of the above schedules	4,031,341	4,533,447
Boots and shoes and insulated wire combined	407,282	542,980
Total	352,675,048	199,737,788

Reclaimed Rubber Produced in Year Ending Dec. 31, 1917.

	Pounds.
Reported by 448 manufacturers in answer to Questionnaire W. S. C. No. 1	110,891,296
Reported by 18 manufacturers of reclaimed rubber	111,244,128
Imported	592,671
Total	222,728,095

Sulphuric Acid Used During 1917.

	Pounds.
Reported by 448 manufacturers in answer to Questionnaire W. S. C. No. 1	21,362,673
Reported by 18 manufacturers of reclaimed rubber	23,357,451
Total	44,720,124

Rubber Export Shipments to Canada

The Bureau of Exports of the War Trade Board, Washington, D. C., informs the rubber trade through the Rubber Association of America that new rulings covering the export of rubber and rubber manufactured goods were put in effect April 10, 1918. The only changes from previous rulings follow:

1. No license will be granted for scrap rubber except to Canada.

2. Individual licenses for manufactured articles containing rubber will not be required for Canada or Newfoundland.

TIRE NEWS

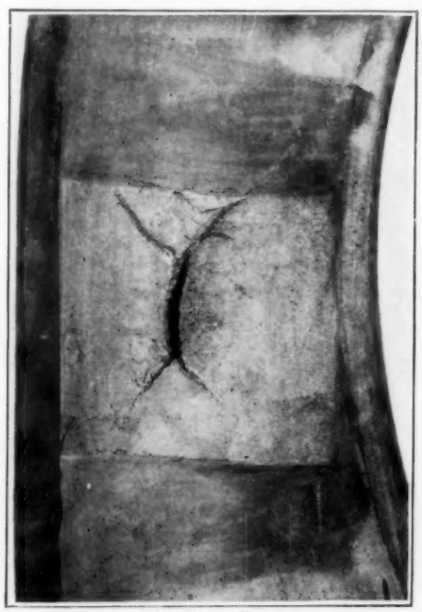
Tire Conservation a Real Necessity

With all that has been written and preached about war time conservation there is one exceedingly important field which the Government's experts seem completely to have overlooked, and that is the conservation of automobile tires.

The conservation of tires has long since ceased to be merely a wise economy on the part of the car user. It has become his patriotic duty. The Government is already a large user of automobile tires and its demands are constantly increasing. At the same time the task of the tire manufacturers has been made more difficult by the war time demands of other industries for the raw materials used in the making of tires.

The Kelly-Springfield Tire Co. furnishes the following valuable observations in the belief that its long practical experience gained from daily observation of the different ways in which tires are ruined, may help car owners to get out of every tire every mile that has been built into it.

This company has always produced tires as nearly perfect as the best workmanship and the best materials obtainable could make them, and while the fact is not denied that defective tires occur even in high grade products of this kind it has found that approximately 85 per cent of the tires returned for inspection has been forced from service by conditions that could in no way be attributed to faulty manufacture but were a direct result of the user's lack of attention to a part of his car that represents one of the greatest expenses of car operation.



A Cut Casing

A Bruised Casing

This fact certainly substantiates the contention that even if tires could be manufactured 100 per cent perfect their performance would still depend largely upon the user and the use and abuse to which he subjects them.

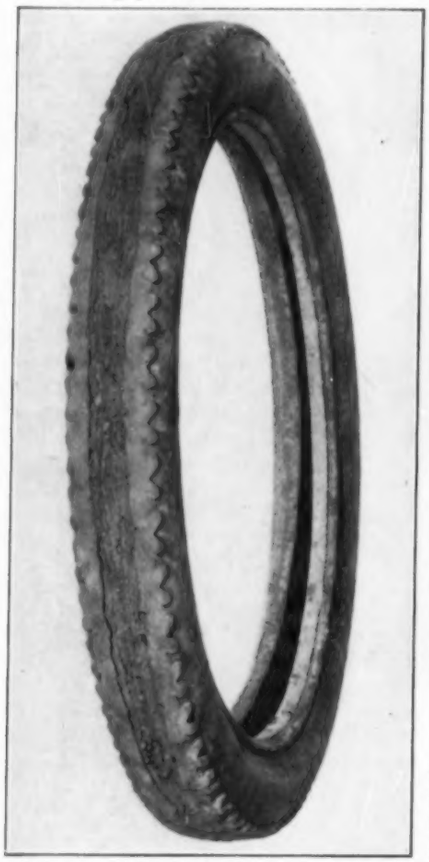
Herewith are given a few concrete examples of tire waste with an expert's conception of their causes and suggestions for their avoidance.

No. 1 received a cut. Probably the user, through the lack of a spare, found it necessary to resort to the use of an emergency patch as a permanent repair, hoping it would wear out the casing. The photograph shows that it did, but long before the tire had returned the mileage of which it would have been capable with proper care. The wise and economical procedure in this instance would have been a permanent repair at the end of the run, resulting in a full return of mileage for money expended as well as peace of mind that was impossible while the fear existed that the emergency repair would give out at the most inopportune time.

No. 2—This photograph shows the result of a bruise. As there is nothing on the tread or face of the tire to indicate damage by accident, the average user would assume that it was due to defect and demand an "adjustment." The facts are that the tire has come into contact with a stone or some object not sharp enough to cleave the resilient tread, but with sufficient force to strain the taut fabric beyond the breaking point. Probably only one or two of the seven plies of fabric were broken by the original blow, but the tremendous

A Victim of Underinflation

pressure and constant action sawed through ply after ply until it reached the inner tube or until the casing became so weakened that the air pressure in the inner tube ruptured the remaining plies.

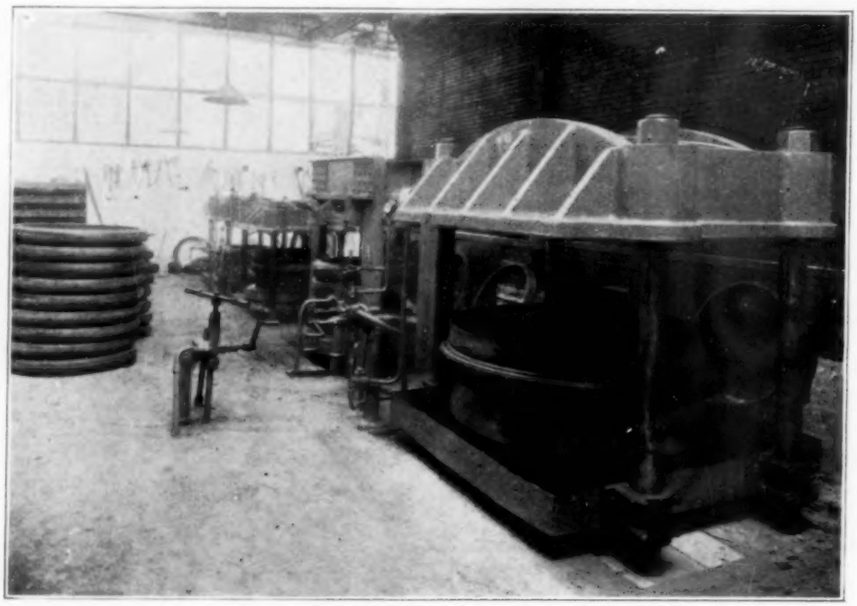


RUINED BY FAULTY WHEEL ALIGNMENT

For the avoidance and remedy of this form of waste the following advice is offered; Watch the road for obstructions. Do not bump into curbs, and in the event of a bruise have the tire permanently repaired.

No. 3—Here is shown a victim of the thickest and surest form of tire destruction, namely, a wheel out of alignment. This is most commonly due to a bent steering knuckle, which causes the wheel to run slightly toed in or out and inflicts a sliding and scraping on the tire that will grind the tread off in a surprisingly short time. Wheels should be tested for alignment occasionally, particularly after a bump that may have sprung a knuckle. Front tires should be watched for abnormal wear, especially a side wear.

The last photograph, No. 4, shows a victim of the bugbear "underinflation." Since the majority of automobile owners have heard a great deal on this subject it is not necessary to go into it except to say that despite the extensive preaching of the tire industry against this abuse as well as overloading, which amounts to the same thing, the practice is still quite prevalent, and the possibilities of conservation are great regarding this one item alone. Care should be taken that tires are of the proper size to carry the weight of the car and the proper amount of air pressure should be maintained to carry that load over the greater number of miles.



HUGE TIRE FITTING PRESSES

Giant Solid Rubber Tires for Traction Engines

In the development of motor traction there is no branch of the industry which has played a more important part than the manufacture of solid rubber tires.

In the early days of the motor truck, owing to experience gained in the manufacture of pleasure cars, it was comparatively an easy matter to provide a suitable chassis for carrying merchandise. The additional weights, however, that it was proposed to carry, brought about the necessity of adopting solid rubber tires instead of pneumatics that had long been recognized as indispensable.

The difficulties of producing solid rubber tires for ponderous vehicles carrying heavy loads were many, as less was known about them. Not only had excessive loads, but also excessive speeds, to be taken into consideration; and it was only by long and consistent experiment and chemical research that a solid tire was produced that made it at all possible for motor traction to compete with horse haulage.

Charles Macintosh & Co., Limited, the pioneer English rubber manufacturers, who entered the solid rubber tire field when it was still in its infancy, have gradually extended the use of rubber tires to steam road tractors that are so extensively used in Great Britain for long hauls of goods. These traction engines are much heavier than motor trucks and require tires; some of them measuring five feet and a half in diameter.

The accompanying photographs give an idea of the huge diameter of these steam road tractor tires and show a unique press installed in the London service station of Charles Macintosh & Co., Limited, to deal with tractor wheels. This press is capable of pressing on a tire 5 ft. 6 in. in diameter, and it is expected that it will prove of the greatest utility to those who have tractors to which they desire to fit solid rubber tires.

GIANT TRACTION ENGINE TIRE

Happenings of Interest to the Tire Trade

U. S. Tire Appointments—New Pennsylvania Branch—Kelly-Springfield Dividend—E. E. Caldwell Goes with Ajax—Kugler and Glass Join Globe—Goodrich Liberty Loan Rally

U. S. Tire Appoints Officers

The Board of Directors of the United States Tire Co., New York, has made Joseph C. Weston vice-president of the corporation. Mr. Weston came to the United States Rubber System when it acquired the Morgan & Wright interests. When the United States Tire Co. was formed he was made manager of the Pacific Coast Division. Afterward he was transferred to the Central Division with headquarters at Chicago, and later came to the main office in New York, where he has been general sales manager for several years, specializing on equipment contracts made with the big car makers, as well as keeping a directional hand on the general sales department.

J. Newton Gunn, president of the United States Tire Co., under whose guidance the company has made remarkable progress, was, of course, re-elected. The other officers, besides Messrs. Gunn and Weston, are: Vice-presidents, Charles J. Butler and Ernest Hopkinson; treasurer, W. H. Blackwell; assistant treasurer, John Williams; assistant secretaries, John D. Carberry and P. O. Eckhart. The Board of Directors, of which Col. Samuel P. Colt is chairman, consists of J. Newton Gunn, Joseph C. Weston, Charles J. Butler, Ernest Hopkinson, Walter S. Ballou, Nicholas F. Brady, James B. Ford, Lester Leland, George S. Shugart, Homer E. Sawyer and Elisha S. Williams. Mr. Shugart's is the only new name on the board. He succeeds Raymond B. Price.

Kugler and Glass Join Globe

The Globe Rubber Tire Mfg. Co., Trenton, N. J., has made important additions to its executive personnel by securing the services of Dr. Herbert W. Kugler and R. F. Glass, both of whom come from the Firestone Tire & Rubber Co., Akron, Ohio.

Mr. Kugler was identified with the Firestone organization for nine years. Originally he was chief chemist and later technical superintendent, in which capacity he had complete charge of the design of the product and productive equipment, as well as the general direction of all materials and manufacturing processes. Born in this country, he was educated in England, and there served several years with a prominent rubber consulting chemist.

Mr. Glass brings to the Globe company thirty-two years' experience in the auditing end of large corporations. For eleven years he was general auditor for the United States Steel Corp., while for eleven years more he was treasurer and member of the executive board of the Michelin Tire Co., Milltown, N. J. At one time he was treasurer of the old American Bicycle Co. He has just completed seven years as general auditor and member of the executive board of the Firestone Tire & Rubber Co.

B. A. Northam Decorated

B. A. Northam, son of W. B. Northam, general sales manager of the Dunlop Tire & Rubber Co., Ltd., with the United States forces in France, has been awarded the D. C. M. for conspicuous gallantry and bravery in the battle of Passchendaele. He joined the 34th Battery at Kingston, and was later transferred to the 33rd. He was through the big fight at the Somme. He has been offered a commission with the Royal Flying Corps of the British army.

Miller Appoints New Connecticut Agent

The Miller Rubber Co., Akron, Ohio, announce that they have apointed the Gunn Rubber Co., 27 Abbott Avenue, Waterbury, Conn., as their agents for the central part of Connecticut, and that the Gunn company will handle a complete line of Miller casings, tubes and tire accessories.

Goodrich Liberty Loan Rally

Patriotism was very evident among 900 Goodrich office girls at the Girls' Liberty Loan rally at the plant on April 8. Talks were made by Rev. R. O. Dowed, three Canadian soldiers and E. C. Tibbits, Goodrich advertising manager.

Pennsylvania Rubber Opens Branch

The Patterson Tire & Rubber Co. has opened an Erie, Pa., branch of the Pennsylvania Rubber Co. at 117 West Ninth Street. It will handle the famous Vacuum Cup tire and other tires manufactured by the Pennsylvania Rubber Co.

The salesrom will be in charge of E. C. and E. G. Patterson, of Jeanette. These men have had wide experience in the tire field. Both were former employes of the Pennsylvania Rubber Co.

Dearth Treasurer of N. J. Car Spring

Elmer E. Dearth has resigned as efficiency engineer of the Lee Tire & Rubber Co., Conshohocken, Pa., to accept a position as assistant treasurer of the New Jersey Car Spring & Rubber Co., Jersey City, N. J. Mr. Dearth has been connected with the Lee Tire & Rubber Co. for the past two years, previous to which time he was connected with the Federal Rubber Manufacturing Co., Cudahy, Wis.

CANADIANS HELPING GOODRICH LIBERTY LOAN CAMPAIGN IN AKRON

Goodyear Has Its Own Campaign

The Goodyear Tire & Rubber Co. is carrying on a special Liberty Bond sale in the factory. The campaign is conducted similar to the recent sucessful stock sale drive.

L. C. Powel, of the housing and finance department, has charge of the sale.

Seiberling Active at Convention

Suppression of the publication of foreign language newspapers for the duration of the war was the chief topic of discussion at the annual convention of the National Chamber of Commerce in Chicago from April 10 to 12, according to F. A. Seiberling, President of the Goodyear Tire & Rubber Co. Mr. Seiberling opposed the plan and was largely responsible for the motion being laid on the table.

"If we are to teach our foreign population Americanism we must talk to them in their own language," Seiberling said. He proposed that foreign languages be abolished in the grammar schools for the duration of the war, but no action was taken on this suggestion.

Haible Is Promoted

H. G. Haible, who has been assistant manager of the Buffalo, N. Y., branch of the Sterling Tire Co. of Rutherford, N. J., has been promoted to the managership of the New Haven, Conn., branch of the Sterling Co. George T. Booth is to take the place of assistant manager at the Buffalo branch.

Kelly-Springfield to Pay Dividend

Holders of the common stock of the Kelly-Springfield Tire Co., New York City, will receive a quarterly dividend of $1 a share on May 1.

Roberts Resigns from McGraw

E. S. Roberts, who turned from managing the truck-tire sales of the Kelly-Springfield Tire Co. to become sales manager of truck tires for the McGraw Tire & Rubber Co., Cleveland, Ohio, has severed his connection with the latter film.

E. E. Caldwell Goes with Ajax

E. E. Caldwell has been appointed assistant advertising manager of the Ajax Rubber Co. of New York. Mr. Caldwell was formerly with the Michelin Tire Co.

Hood Rubber Co.'s Sales Increase

The annual report of the Hood Rubber Company for the year ended Dec. 31, 1917, shows gross sales of $18,573,765 as compared with $11,666,501 in 1916, and $9,083,693 for 1915. The increase in the surplus account indicates that the earnings on the $3,000,000 common stock equaled 51.11 per cent. Sales for the past four years compare:

Dec. 31.	Sales.	Dec. 31.	Sales.
1917.....	$18,573,765	1915.....	$9,083,693
1916.....	11,666,501	1914.....	8,954,000

The balance sheet as of Dec 31, compares:

Assets.	1917.	1916.
Plant	$4,000,000	$2,900,000
Merchandise	4,075,021	1,846,309
Receivables	4,323,933	3,542,211
Invest. in other corp'ns	184,400	.....
Patents	1,000	.....
Cash	930,680	318,180
Liberty bond account	233,096	.....
Totals	$13,748,131	$8,606,700
Liabilities.		
Common stock	$3,000,000	$2,600,000
Preferred stock	4,000,000	2,750,000
Notes payable	4,150,000	2,280,000
Surplus	2,312,291	1,076,700
Liberty bond account.	285,840	.....
Totals	$13,748,131	$8,606,700

Merchandise in process of importation and letters of credit and drafts discounted in connection therewith, are not included in the foregoing.

Treasurer Frederic C. Hood said in part to stockholders:

"Earnings showed an increase proportionate to our sales. After paying 10 per cent dividends on the common stock and 7 per cent on the preferred stock and charging off the usual liberal amounts for depreciation, we have added a substantial amount to our surplus.

"With the increasing business there have been developed ten department managers in charge of a management organization capable of managing the future growth of the company. On Dec. 31, 1917, there were employed in our factory about 8000 persons. Our daily production is over 75,000 pairs of rubber and canvas footwear; over 900 pneumatic automobile tires, over 900 tubes; over 100 solid tires."

Miner to Enlarge Plant

The Miner Rubber Co., Granby, Quebec, Canada, has had plans prepared for building an addition to its plant. It is estimated that the addition will cost $15,000. J. S. Archibald, 314 Dorcester Street, West Montreal, Canada, is the architect.

Recent Rubber Incorporations

The I. & R. Double Tread Tire Co., Inc., Richmond, Ind.; Capital, $5,000; Incorporators: J. E. W. Johnson, J. E. Brannon.

Akron Biltwell Tire & Rubber Co., Akron, Ohio, has increased its capital from $200,000 to $1,000,000.

Mohawk Rubber Co., Akron, Ohio, has increased its capital from $1,050,000 to $2,050,000.

Resilient Wheel & Rubber Co., New York; Capital, $1,000,000.

Profit Sharing Tire Sales Co., New York; Capital, $50,000; Incorporators, W. Metkif, F. D. Benson.

Equitable Tire & Rubber Co., Inc., New York City; to manufacture automobile tires; Capital, $1,000; Incorporators: S. Bernheim and C. Weldon.

Akron Rubber & Tire Co., Chicago; Capital, $50,000; Incorporators: Jacob Sandrovitz, David Waldman, Emil Borman.

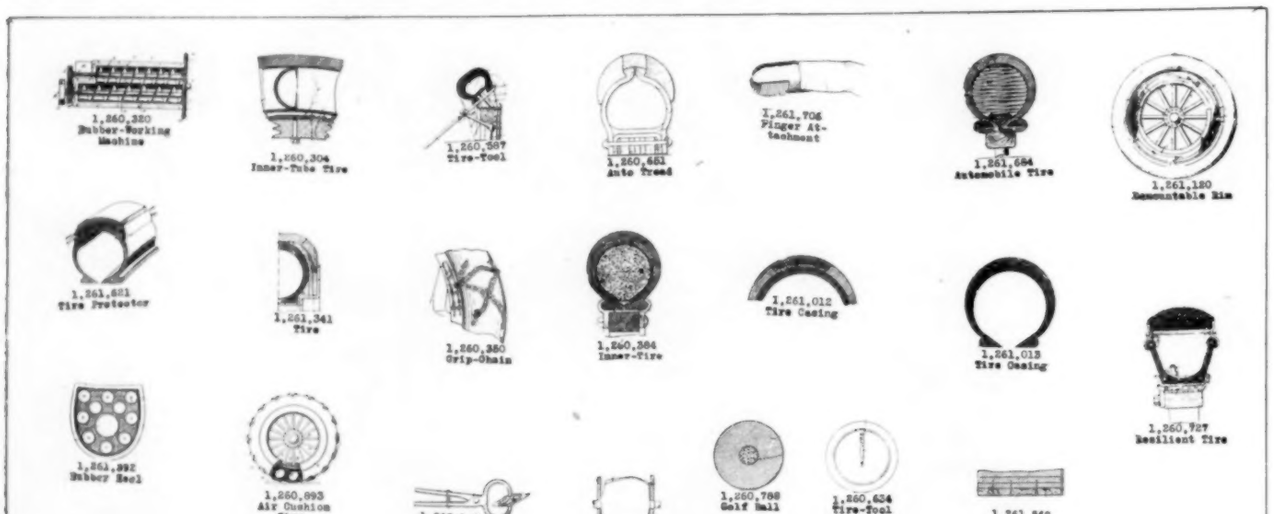
Lomont & Co., Fort Wayne, Ind.; Capital, $75,000; to sell tires, automobile supplies and accessories.

Electric Vulcanizing Rubber Co., Akron, Ohio; Capital, $100,000; Incorporators: H. T. Schlegel and W. W. Irwin.

Miller Tire Co. of Newark, Newark, N. J.; Capital, $25,000; to deal in automobile tires and accessories; Incorporators: C. D. Sanderson and S. G. Bedworth.

Packard Manufacturing Co., Auburn, Maine; Capital, $50,000; to manufacture rubber goods and shoes.

Resilient Wheel & Rubber Co., Dover, Del.; to manufacture and deal in wheels of all description.



American Rubber Patents

ISSUED MARCH 26, 1918

1,260,291—To James T. Alvis, Fort Worth, Tex. Tube-vulcanizing apparatus.

1,260,304—To William R. Betham, Chicago, Ill. Resilient pneumatic inner-tube tire.

1,260,320—To George W. Bulley, Chicago, Ill. Rubber-working machine.

1,260,350—To Albert W. Edeborg, Jamestown, N. Y. Grip-Chain for tires.

1,260,384—To Josef Huebner, Milwaukee, Wis., assignor to Pan-American Rubber Co., Milwaukee, Wis. Method of making inner tires for vehicles.

1,260,455—To Francis M. Rilleau, San Francisco, Cal. Quickly detachable means for securing tires.

1,260,506—To Arcade G. Boivin, Cohoes and Frederick J. Davignon, Troy, N. Y. Tire-protector and auxiliary tread.

1,260,580—To Loren Risk, Minneapolis, Minn. Vulcanizer.

1,260,587—Henry A. Sorrell, Asheville, N. C. Tire-tool.

1,260,625—To William E. Bates, Denver, Colo. Plastic composition and method of making same.

1,260,634—To August L. Buhrmeister, Suisun, Cal. Tire removing and replacing tool.

1,260,651—To William H. Courtenay, Philadelphia, Pa. Auto-tread.

1,260,684—To Fritz Kempter, Stuttgart, Germany, assignor to Cannstatter Misch & Knetmaschine fabrik; Cannstatter Damp-Backofenfabrik Werner & Pfleider, Cannstatt, Wurtemberg, Germany. Rubber-mixing machine.

1,260,727—To William Steinberg, Jamaica, N. Y., assignor of one-third to Daniel Wegner, New York. Compound resilient tire.

1,260,788—To Ellis Miller, London, England, assignor to The Radium Golf Ball Co., Limited, N. Y. Golf and like ball.

1,260,791—To Hydesaburo Ohashi, New York. Automobile tire.

1,260,893—To William J. Guest, Milford, Conn. Air cushion tire.

1,260,990—To Henry J. Doughy, Edgewood, R. I., assignor to Doughty Tire Co., Portland, Me. Vulcanizing apparatus.

1,260,992—To William C. Stevens, Akron, Ohio, assignor to The Firestone Tire & Rubber Co., Akron, Ohio, a corporation of Ohio. Motor-tire-applying apparatus.

ISSUED APRIL 2, 1918

1,261,012—To Demetreos J. Demas, Pittsburgh, Pa. Tire casing or shoe.

1,261,013—To Demetreos J. Demas, Pittsburgh, Pa. Tire-casing.

1,261,120—To William Gries, Newark, N. J. Demountable rim.

1,261,341—To Stephan Baader and August Rieffel, Philadelphia, Pa. Tire.

1,261,392—To Gustav A. Huben, Chicago, Ill. Rubber heel.

1,261,525—To Ellis S. Helwitz, Brooklyn, N. Y. Shoe-heel.

1,261,546—To Henry Junghann, Davenport, Iowa. Tire-pressure gage.

1,261,569—To William John Luxmore, London, England. Heel of boots and shoes.

1,261,621—To Peter Richard, Detroit, Mich. Tire-protector.

1,261,684—To Lorenz F. Biesmeyer, Chamois, Mo. Automobile-tire.

1,261,706—To James B. Conley and James G. Smith, Fresno, Cal. Finger attachment.

1,261,749—To William A. Bond, Lynn, Mass., assignor by mesne assignments, to United Shoe Machinery Corp., Paterson, N. J., a corporation of New Jersey. Machine for use in the manufacture of boots and shoes.

MARKETS

Manufactured Rubber Goods

NEW YORK, April 23, 1918.

A general improvement in the rubber business of the country is indicated by reports from both retail and wholesale sources. In the East, however, transportation difficulties continue to adversely affect local conditions and there is little improvement in deliveries. Seasonable goods are not moving as rapidly as expected, due probably to weather conditions, and this has caused a setback to the usual spring activities of the retail trade.

In the West, on the other hand, both the city and country dealers are apparently turning out more sales than they were during this period of last year.

Much interest is manifested in the trade in the recently revised priority list, designed to insure fuel and transportation to the industries necessary to the war and essential to public welfare. Apparently the rubber industry is given a fair share of priority, although naturally some manufacturers complain that they are hard hit. It is apparently not the intention of the War Industries Board to arbitrarily restrict shipments of coal and raw materials for less essential plants, but such materials and coal will be held back until the more essential manufactures are taken care of.

The list is not yet complete, and more lines of manufacture may later be certified as essential to the carrying on of the war.

MECHANICAL GOODS

The demand for most lines of mechanical rubber goods is heavy and increasing in volume; belting, packing and hose can barely be produced in sufficient quantities to meet all demands. The usually intense manufacturing brought about by war demands and the growing use of motors for farm work have greatly added to the demand for belting. The fact that there has been little rain recently in the West is making the demand for garden hose somewhat earleir than usual. The scarcity and high cost of cotton fabric is cutting down the output of garden hose and, with the daily increasing popularity of garden work, it is very likely that hose will run short before the season is passed. In fact it is reported that the Government has taken over a large part of the cotton sheeting held by rubber manufacturers for making garden hose.

TIRES

Tires and automobile accessories are going out in a larger volume than usual according to reports from different parts of the country. The long winter, with the icy roads, and the prolonged use of chains, caused unusual wear on tires, with the result that sales are far greater than was expected. There are no price advances to report, but in this connection, it can be stated that advances are scheduled to appear in the near future, due to the shortage of cotton duck and the advancing of almost all other items in cost of production.

Jobbers are advising dealers to anticipate their fall tire requirements and place their orders as soon as possible to insure delivery.

FOOTWEAR

Rubber footwear manufacturers from all sections of the country met in Washington on April 18 to confer with officials of the Quartermaster's Corps on the new specifications for rubber boots and arctics, which are published elsewhere in this issue of THE RUBBER AGE AND TIRE NEWS. These specifications combine the suggestions made by the rubber footwear manufacturers and those from General Pershing's officers based on their experience with such goods in the field. It is expected that orders will be placed for nearly 3,000,000 pairs of arctics and 1,000,000 pairs of rubber boots within the next few days. This confirms the opinion expressed some time ago in these columns that there will be a shortage of rubber footyear for civilian use, because Government orders naturally will be executed before civilian trade receives attention.

DRUGGISTS' SUNDRIES

Whichever way one turns in the rubber sundries' trade the same conditions are found in the increasing volume of Government business bearing closely or even remotely on the war. Regular business is only fair, orders are coming in about as they have been during the past two or three months. Certain articles like water bottles are in good demand.

Until April 19 the Medical Supply Depot, United States Army, 628 Greenwich Street, New York, was receiving sealed proposals for furnishing and delivering f.o.b. factory, the following rubber sundries: hand atomizers, hot-water bags, ice bags, bandages, flexible catheters, rubber tips for crutches, small air cushions, rubber gloves, rubber sheeting, powder sprinklers, bulb syringes, fountain syringes, tourniquets and bandages, rectal tubes, and stomach tubes. At this writing the awards of contracts on these supplies have not yet been made public.

Cotton, Yarn and Fabric

NEW YORK, April 23, 1918.

Violent fluctuations occurred in the quotations of the New York Cotton Exchange during the past fortnight. These fluctuations were no doubt a natural result of the conditions under which the high prices of raw cotton of the season were made possible. The decline in futures checked the demand for spot cotton, and the various statements as to price fixing either of cotton or of cotton goods produced a feeling of uncertainty not conducive to a disposition to maintain artificially high prices. Export demand is at a low ebb, and the consumption of cotton in the domestic mills showed a decided drop last month. The crop being planted comes in for a great deal of notice. In general, weather and other conditions have been favorable, and the outlook for a large crop seems good, despite the fact of the willingness of some in the trade to bet that the yield will not exceed 12,000,000 bales.

EGYPTIAN COTTON

The fluctuations in cotton futures during the last fortnight has produced very irregular and uncertain conditions in the extra staple cotton market. Some brokers say that their shippers have not lowered their asking prices in the least on anything longer than an inch and an eighth. Others state that the asking prices of some shippers are down about a half a cent a pound. This, of course, is very little as compared with the decline of five cents a pound in futures that was experienced last week. One thing certain is that the sharp decline on the futures market did not lead to any great cutting of asking prices on long staples. Only a small scattering business has been done in extra staples in the past six days, mills showing no disposition to jump in and try to buy cotton cheap in anticipation of their requirements.

Egyptians f.o.b. Alexandria are reported to be slightly easier, Sakelarides being quoted at 48 to 50 cents and uppers 45 to 46 cents. There is no change in the Egyptian shipping situation, only two more cargoes of Egyptian cotton being in prospect at this time.

SEA ISLAND

The market at Savannah has been very quiet during the past fortnight. The break in Uplands had some effect on holders, but not to any great extent. It is understood that the equivalent of 73½ cents c.i.f. has been bid pretty generally throughout the interior for average Extra Choice without any cotton changing hands.

There has been some replanting in the Sea Island belt caused from damage by the cold spell, but the belief is that it has not been general.

In New Bedford the Sea Island market remains unchanged at 75½ cents for average Extra Choice. Some Sea Island business is reported to have been done last week in Providence.

New England mills are taking much interest in the forthcoming cotton conference in New York City. It appears that the trade may agree on a sixty or ninety day acceptance as a compromise between present buying terms and the desires of many of the mills. This compromise will not meet the ideas of many of the mills, for they would like the time of payment for cotton to be left unfixed, except that it would be a given number of days after the arrival of the cotton at the mill. If a fixed day is set and the sale financed by acceptance the Southern shipper has no more interest than at present in hurrying shipments, and the mills are obligated to pay for cotton on the date fixed whether the cotton is up to specifications or not.

YARNS

The falling off in the raw cotton prices had no notable effect on the cotton yarn market, which remains firmer than ever. The inquiry for yarns is said to be considerable, but no one will say that its effect is noticeable in the market.

There is no considerable talk about price fixing, but no one appears to have a clear conception of how it might be brought about. Spinners claim that they are barely making a living profit at the present rate of quotations and that price fixing that would insure a fair profit would be welcome. As far as the Government is concerned, its chief desire appears to be that the trade regulate itself.

FABRICS

The demand for many fabrics is reported much smaller during the last week or ten days, since cotton has declined, than formerly. The fall in cotton values has not yet affected its manufactures and the mills feel that there is no reason why it should do so, in view of the well sold position of the mills, which are in full control of the fabric situation. The mills have all the forward business on their books that they want, and have provided themselves with cotton to cover these forward orders. They do not need to speculate in cotton today to make a profit, and they are not inclined to speculate unnecessarily with cotton around 30 cents a pound.

TIRE FABRICS

There is no change in the tire fabric market, which continues to show an advancing tendency and a disposition to become even firmer than it has been for some time. The mills have all the work they can handle for civilian account due to the pressure of Government orders and the shortage of labor, which is very acute. Many looms are reported to be idle for no other reason than lack of weavers. It is said that the average shortage of weavers is between 10 and 15 per cent.

HOSE AND BELTING FABRICS

There is no change to report in the market for mechanical fabrics. Quotations are nominal, as Government requirements are taking all the goods the mills can produce, and none are available for other than work connected in some way or another with Government needs.

DRILLS, OSNABURGS AND SHEETINGS

The recent flurry in the raw cotton market prices was not felt in the market for drills, osnaburgs and sheetings, the prices of which held firm and in instances advanced slightly on comparatively small transactions in the face of events. The size of Government requirements is threatening to put a total stop to the execution of civilian orders. A few small lots of Osnaburgs were sold recently at 23½ cents, at which price they have been stationary for some time. Sellers generally appear to be indifferent and, as a whole, the market can be characterized as very quiet, the trade not looking for business.

BURLAPS

The burlap market continues steady with no marked increase in sales. Holders seem assured of good values of the goods they have here and afloat, though in the past it has been the custom to take pains to sell burlaps before their arrival in this country, so that transportation and storage would devolve upon the buyer.

New York Quotations

TIRE FABRICS		
17¼-ounce Sea Island, combed,	sq. yd.	$1.60@1.80
17¼-ounce Egyptian, combed		1.30@1.50
17¼-ounce Egyptian, carded		1.25@1.35
17¼-ounce Peelers, carded		0.90@1.05
17¼-ounce Peelers, combed		1.00@1.20
DUCKS		
Single Filling (pound basis)	lb.	.66
Double Filling (pound basis)		.80
DRILLS		
37-inch 2.35-yard	yd.	.33
37-inch 2.75-yard		.32
37-inch 3.00-yard		.28
37-inch 3.25-yard		.27
37-inch 3.50-yard		.25
37-inch 3.95-yard		.24
37-inch 2.00-yard Southern	lb.	.56
38-inch 2.00-yard Northern		.56½
40-inch 2.47-yard Northern	yd.	.30
40-inch 2.47-yard Northern		.35
52-inch 1.90-yard Southern		.37
52-inch 1.90-yard Northern		.34
SHEETINGS		
40-inch 2.25-yard	yd.	.35
40-inch 2.50-yard		.36
40-inch 2.85-yard		.34
40-inch 3.00-yard		.32
40-inch 3.25-yard		.32
40-inch 3.60-yard		.26
40-inch 3.75-yard		.24
40-inch 4.25-yard		.20
38-inch Jacket Cloths		21@23
BURLAPS (Spot Carload Lots)		
40-inch 8-ounce		22.00
40-inch 10-ounce		24.00
40-inch 10½-ounce		23.75

Chemicals and Compounding Materials

NEW YORK, April 23, 1918.

Price movements in the market for chemicals and compounding materials have been irregular in the past fortnight. Deliveries against existing contracts were up to normal, despite the freight situation, but new business fell off to some extent. Sulphur prices were firmly maintained. Zinc oxide was quotably unchanged so far as contracts were concerned, but spot offerings were limited and higher prices obtained in some quarters. Sulphuret of antimony was steady in tone. Caustic soda displayed slight weakness on freer offerings. Glycerine closed lower in the absence of important business. Interest was shown in rapeseed oil, spot offerings of which were scanty and prices more or less nominal. There was a firmer market for magnesia, both the calcined and carbonate.

ANILINE OIL

Producers reported sales of aniline oil for immediate shipment at 27c per pound, drums extra, which would indicate that the market has been holding firm. Second-hands were not so much in evidence with offerings at concessions.

BENZOL

Stocks were plentiful and prices, while quotably unchanged,, were barely steady. Leading producers held out for 35c per gallon, bulk basis, immediate shipment from works, but it was possible to do 30c per gallon in several quarters.

LEAD PIGMENTS

The recent weakness in pig lead had no influence upon the market for the lead pigments. Corroders report that other producing costs have risen to such an extent that slight price fluctuations in the metal are virtually being ignored. Sublimed white lead is held at 8½c per pound, car-lots or more.

MAGNESIA

There was a firmer market for the magnesia products and higher prices obtained in several quarters. Producers appear to be well sold up. Carbonate of magnesia, in bags has been raised to 11 to 11½c per pound, with barrels quoted at 12½ to 13½c per pound, as to brand, etc. Calcined, heavy, closed nominally at 12@13c per pound.

OILS

Spot stocks of vegetable oils are comparatively light, due chiefly to the transportation situation. Quotations in many instances are wholly nominal. Refined rapeseed oil closed at $1.78@$1.90 per gallon, as to quantity and seller. A sale was reported at $1.76 during the interval. All palm oil imports are being absorbed by the tin plate mills, under special arrangement with the British Government.

SULPHUR

Difficulty in moving supplies of crude brimstone from the mines tends to support the market for refined. The market closed nominally unchanged on the basis of $3.85 per 100 pounds, in barrels, for car-lots.

Prices Current for Chemicals, Fillers, Colors, etc.

Acetone	lb.	*.38	@	.40
Accelerator, in drums	lb.	.85	@	1.00
Acids, Acetic, 56%	lb.	.14	@	.15
Carbolic, C. P.	lb.	.53	@	.54
Cresylic, 95%	gal.	1.15	@	1.20
Muriatic, 20 deg.	lb.	.02½	@	.02¾
Acids, Muriatic, 22 deg.	lb.	.03	@	.03¼
Nitric, 42 deg.	lb.	.09	@	.09½
Nitric, 40 deg.	lb.	.08½	@	.08¾
Sulphuric, 60 deg.	lb.	.02	@	.02¼
Tartaric, crystals	lb.	.79½	@	.80
Aluminum Flake	ton	28.00	@	30.00
Aniline oil, bulk basis	lb.	.27	@	.27½
Antimony, metal spot	lb.	12.25	@	12.50
Oxide	lb.	15.00	@	17.00
Sulphuret, red	lb.	.25	@	.26
Sulphuret, golden	lb.	.26	@	.28
Sulphuret, crimson	lb.	.45	@	.50
Asbestos	ton	35.00	@	45.00
Asphaltum, Egyptian	lb.	.22	@	.28
Domestic	ton	22.00	@	28.00
Barium sulphate, technical	lb.	.04½	@	.05
Sulphide	lb.	.07	@	.07½
Barytes, prime white imported	ton*	40.00	@	45.00
white, domestic	ton	36.00	@	38.00
off color, domestic	ton	23.00	@	26.00
Benzol, pure, bulk	gal.	.30	@	.35
Beta-naphthol, sublimed	lb.	.85	@	.90
unsublimed	lb	.65	@	.70
Blacks, Drop	lb.	.08	@	.15
Ivory	lb.	.16	@	.30
Carbon gas, cases	lb.	.22	@	.30
Lampblack, R. M.	lb.	.14	@	.16
Mineral blacks	ton	28.00	@	32.00
Blues, Prussian	lb.	*.85	@	1.25
Soluble	lb.	.82	@	1.10
Ultramarine	lb.	*20	@	.45
Browns, Umber, Turkey, burnt, powdered	lb.	.04	@	.05
American, burnt	lb.	.03½	@	.03¾
Cadmium sulphide, yellow	lb.	2.00	@	2.25
Carbon, bisulphide, bulk	lb.	.08¼	@	.08½
tetrachloride, drums	lb.	.15½	@	.16
Caustic Soda, 76@78%	lb.	.04⅞	@	.05⅝
Chalk, precipitated, extra light	lb.	.05	@	.05¾
light	lb.	.04¾	@	.05¼
heavy	lb.	.03¾	@	.04¼
China clay, domestic	ton	20.00	@	23.00
imported	ton*	38.00	@	42.00
Fossil flour	lb.	.03¾	@	.05
Gilsonite	ton	55.00	@	60.00
Glue, extra white	lb.	.65	@	.75
medium	lb.	.28	@	.34
low grade		.15	@	.20
Glycerine, C. P. (drums)	lb.	.66	@	.67
Graphite, flake (bbl.)	lb.	.18	@	.20
powdered (bbl.)	lb.	.13	@	.15
Green, chrome, R. M.	lb.	.14	@	.20
Ground glass (fine)	lb.	.03½	@	.04
Hexamethylene	lb.	1.15	@	1.17
Infusorial earth, powd'd.	ton	60.00	@	—
bolted	ton	70.00	@	—
Iron oxide, red, reduced grades	lb.	.05	@	.06
red, pure, bright	lb.	.12	@	.15
Lead, red oxide of	lb.	.10	@	.10½
sublimed blue	lb.	.08½	@	.09
white, basic carb.	lb.	.09	@	.09½
white basic sulph.	lb.	.08½	@	.09
Lime flour	lb.	.01½	@	.01¾
Litharge	lb.	.09½	@	.10
English	lb.	*.12	@	.13
sublimed	lb.	.09¼	@	.09¾
Lithopone, domestic	lb.	.07	@	.07½
Magnesia, carbonate	lb.	.12	@	.13
calcined, heavy	lb.	.12	@	—
calcined, light	lb.	.70	@	—
Magnesite, calcined, pwd.	ton	65.00	@	70.00
Mica, powdered	lb.	.03¾	@	.04¾
Mineral rubber (asphaltum base)	ton	70.00	@	100.00
Naphtha, motor gasoline, (steel bbls.)	gal.	.24	@	—
68 @ 70 degrees (steel bbls.)	gal.	.30	@	—
70 @ 72 degrees (steel bbls.)	gal.	.31	@	—
73 @ 76 degrees (steel bbls.)	gal.	.33	@	—
machine (wood bbls.)	gal.	.42	@	—

Oil corn, crude.....cwt.	18.75	@	19.00
corn, refined.....cwt.	21.22	@	21.42
linseed (bbl.) .....gal.	1.54	@	1.56
palm, Lagos.....lb.	*.39	@	.40
pine, yellow .....gal.	.45	@	.46
rapeseed, refined...gal.	*1.78	@	1.88
rapeseed, blown....gal.	*1.90	@	2.00
rosin, first rectified.gal.	.42	@	.43
tar (commercial)..gal.	.30	@	.32
Orange mineral, American.lb.	.13	@	.13½
imported .....lb.	*.15	@	.20
Paraphenylenediamine ...lb.	3.00	@	3.50
Petrolatum, bbls., amber.lb.	.05¼	@	.05½
pale yellow .....lb.	.05½	@	.06
Pine tar, kiln.....bbl.	12.00	@	12.50
Pitch .....bbl.	4.25	@	4.75
Plaster of paris.....bbl.	2.00	@	2.50
Red, Tuscan .....lb.	.24	@	.30
Indian (reductd)..lb.	.07	@	.09
Standard .....lb.	.10	@	.15
Rosin (common to good) @ 280 lbs. .....bbl.	6.10	@	6.20
Rotten stone, powdered..lb.	.03¼	@	.04½
Rubber, substitute, black.lb.	.13	@	.17
white .....lb.	.15	@	.24
brown .....lb.	.20	@	.25
Shellac, fine orange.....lb.	.68	@	.69
T. N. .....lb.	.62	@	.63
Bleached ordinary...lb.	.59	@	.60
Bleached, bonedry...lb.	.70	@	.71
Silex (silica) .....ton	28.00	@	36.00
Soapstone, powdered....ton	18.00	@	22.00
Starch, corn, powdered..lb.	5.17	@	5.27
Sulphur, crude .....ton	*50.00	@	..
refined, flour, per 100-pounds, ...in bbls.	3.85	@	4.40
roll	3.70	@	4.15
commercial	3.25	@	3.50
Talc, American .....ton	15.00	@	18.00
French .....ton	*25.00	@	30.00
Toluol, pure, in drums..gal.	*1.75	@	2.00
Tripolite earth.....ton	60.00	@	70.00
Turpentine, pure gum—			
spirits .....gal.	.42	@	.43
wood .....gal.	.40	@	.41
Venice, artificial..gal.	.12	@	.13
Vermilion, English.....lb.	2.00	@	2.10
Wax, beeswax, crude yel.lb.	.37	@	.38
ceresin, white ....lb.	.18	@	.19
carnauba, No. 3...lb.	*.75	@	.77
Wax, Montan .....lb.	*.35	@	.40
ozokerite, black...lb.	.75	@	.80
ozokerite, green...lb.	*.85	@	.95
Paraffin, refined, 118/120 M. P. (bbls.).....lb.	.13¼	@	.13½
Wax, Paraffin, 123/125 M. P. .....lb.	.13½	@	.13¾
128/130 M.P.....lb.	.13¾	@	.14
133/136 M.P.....lb.	.15	@	.15¼
Crude, 120/122 M.P....lb.	.10¼	@	.10½
124/26 M.P.....lb.	.10½	@	.10¾
Whiting, commercial....cft.	1.00	@	1.10
Alba .....cwt.	1.00	@	—
Whiting, Paris, white, American .....cwt.	1.25	@	—
English cliffstone.cwt.	1.50	@	—
Yellow chrome.....lb.	.24	@	.30
Zinc oxide, American process, horsehead brand..lb.	†.10¼	@	.10½
selected .....lb.	†.10¾	@	.11
"XX red".....lb.	†.10¼	@	.10½
French process, green seal .....lb.	†.13½	@	.13¾
red seal .....lb.	†.13	@	.13¼
white seal .....lb.	†.14	@	.14¼
Zinc substitutes.....ton	35.00	@	40.00
Zinc, sulphide, pure.....lb.	*.08	@	—

†Contract prices. *Nominal.

Crude Rubber

NEW YORK, April 23, 1918.

Announcement from Washington to the effect that imports of crude rubber will be curtailed, so as to provide ocean tonnage for war needs, was followed by a general withdrawal of offerings and a sharp upturn in prices. Contrasted with a fortnight ago, prices for the leading descriptions scored advances amounting to 8 and 10c per pound. There was quite some covering by frightened shorts, but manufacturers, as a rule, took hold sparingly, pending official announcement of the plan now under consideration by the Government.

Later it was reported that in order to prevent excessive speculation in rubber and also to prevent inflation of values the Government would probably fix a maximum price. All sorts of reports were circulated in the trade as to just what form the order regulating imports will take, but it was generally conceded that imports, in all probability, will be cut to the extent of 50 per cent. This would bring the total imports at approximately 100,000 tons annually, distributed as follows:

Government needs	37,000 tons
Boots and shoes	16,000 tons
Solid tires	25,000 tons
Mechanical goods	12,000 tons
Cable and insulating	10,000 tons
Total	100,000 tons

This is a tentative program outlined to members of the trade by officials in Washington. It is to be noted that no provision is made for pneumatic tires, and, in the opinion of trade authorities, manufacturers will be forced to fall back on their reserve stocks for some time at least. It is estimated that some 70,000 tons of crude rubber are on hand and in transit. The order restricting the imports will be announced shortly and will hold for a period of ninety days, after the expiration of which, it may be renewed or changed so as to embody modications.

First latex pale crepe closed nominally at 69@70c per pound, spot delivery, and at 67c per pound for May-July delivery. Ribbed smoked sheets were offered on a parity with first latex covering the spot position, while for May-July 66c might have been done. Owing to the uncertainty surrounding the import situation importers were not willing to quote on distant deliveries.

Para up-river fine met with a good inquiry and after holding around 61c per pound for some time the market moved upwards sharply, closing at 69@70c per pound, with sellers shy. Up-river medium closed at 57c per pound, with coarse at 38½c per pound. Coucho ball also closed at 38½c nominal. Islands fine was advanced to 55c per pound. Cameta settled at 28c, with offerings limited.

Central American descriptions were strong, closing on an average of 2c higher. Corinto was held at 37@38c per pound. Balata, prime stock, closed at 88c per pound. Guayule extract was advanced to the basis of 30@31c per pound. East Indian gums closed at 14½@15c per pound.

	Spot.	May-July.	Aug.-Oct.
Para—Up-river fine.....lb.	69	68	..
Up-river medium	58	57	..
Up-river coarse.....	38½	38	..
Caucho ball.....	38½	38	..
Islands fine	55	..	..
Islands coarse	28	..	..
Cameta	28	..	..
Maderia fine	70	..	..
Ceylons-Smoked sheets, ribbed	70	66	*66
Smokers sheets, plain.....	69	65	..
First latex pale crepe.....	70	67	*67
Amber crepe.....	64	63	..
Clean brown crepe.....	62	60	..
Centrals—Corinto, prime.....	37	37	..
Esmeralda, prime.....	36	..	..
Mexican scrap	35	..	..
Balata sheets	88	..	..
Balata, block Panama.....	59	..	..
Guayule	30	..	..
Africans—Rio Nunez, string..	*65	..	..
Massai, red	*50	..	..
East Indian Pontianak.....	14½	..	..
Palembang	15	..	..

* Nominal.

Scrap Rubber

New York, April 23, 1918.

The scrap rubber market continues void of interesting developments due principally to the lack of interest displayed by rubber reclaimers and to the railroad situation, two factors which naturally tend to make the market dull. The undertone, however, is firm.

The following prices were paid for scrap rubber recently delivered at the reclaiming mill:

Boots and shoes.....	..	9¼
Arctics, trimmed	7	..
Arctics, untrimmed	6	..
Tires—Automobile	4¾	..
Bicycles, pneumatic.....	5¼	..
Mixed hose	1¾	..
Air brake	5¾	..
Inner tubes, No. 1	22½	..
Inner tubes, No. 2	11½@11¾	
Inner tubes, red	11½	..

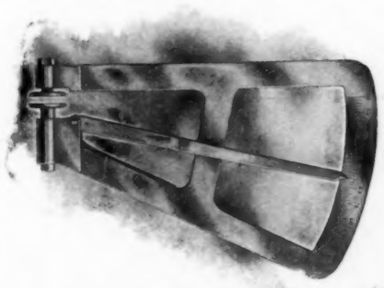
John Gibney Managing Polack Sales

John L. Gibney has become manager of sales for the Polack Tire & Rubber Co., of New York City. In doing so, he returns to his old field of activities, the Gibney Bros., Jas. L. and John, having built the sold tire business of the Gibney Tire & Rubber Co., on the foundation of their old partnership established in Philadelphia years ago. From this they withdrew last July, when the Gibney company was purchased by the Fisk Rubber Co.

Goodyear Opens New Service Station

The Goodyear Tire & Rubber Co. has opened a new service station at 1010 Locust Street, Des Moines, Iowa.

MEASURING GAUGES



FOR MEASURING SHEET RUBBER

HOME OF

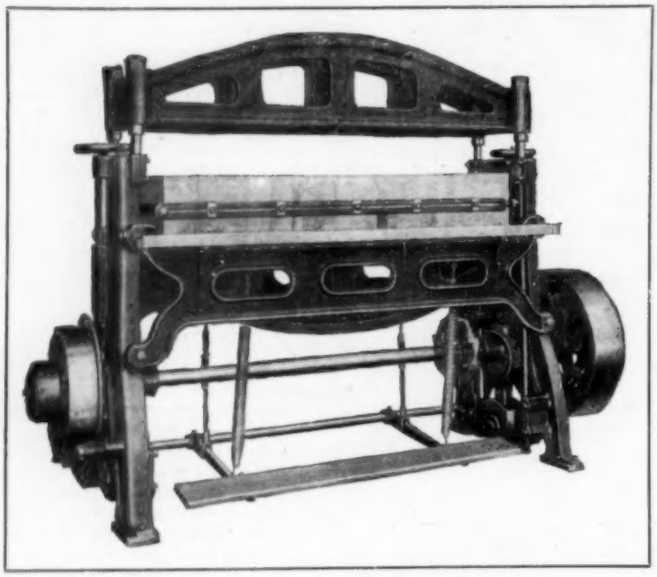
BALL BEARING STITCHERS

AND ROLLERS FOR TIRE & SHOE MANUFACTURING

TOOLS OF QUALITY

(ESTABLISHED IN 1849) THE HOGGSON & PETTIS MFG. CO. NEW HAVEN, CONN., U. S. A.

Gearless Sole-Cutting Machines



These machines are of a type that are being used very extensively in the different trades where dies are employed for cutting out parts from Leather, Rubber (cured and uncured), Rubberized Duck, Linings, Friction Cloth and all other materials used in the making of Canvas or Arctic footwear.

They are manufactured in several sizes and styles to meet the various requirements. Their construction is substantial and reliable throughout.

Further particulars and printed matter will be promptly furnished upon request.

UNITED SHOE MACHINERY CORPORATION

Albany Building *General Department* **BOSTON, MASS.**

F. R. Henderson & Co.

IMPORTERS

Crude Rubber

NEW YORK CITY AKRON, OHIO